LEAFLETS

OF

PHILIPPINE BOTANY

Edited by A. D. E. ELMER, A. M.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. IX. Manila, P. I., March 9, 1920. Art. 122.

Few New Ferns from Mt. Bulusan

by

E. B. Copeland

(*Chico, California*)

Davallia elmeri Copel. n. sp.

Species *Davallia solidae* affinis, textura haud coriacea rhachibus laminisque pubescentibus distinguenda; rhizomate ad truncos arborum scandente, 8-10 mm. crasso, duro, basibus parvis nigris densissime imbricatis vestito palearum, quarum partes apicales elongatae fulvo vel albido-marginatae ciliatae etenim appressae solumnodo apicem versus rhizomatis conservantur; stipite 10-20 cm. alto, deorsum castaneo, sursum rhachibusque plerumque pallidioribus paleis angustis dense ciliatis sat persistentibus vestitis; fronde 30-40 cm. alta, fere aequilata, deltoidea, deorsum tripinnata, pinnis pinnulisque majoribus valde acuminatis, papyraceis, inter soros haud fissis; venulis spuriis nullis; indusio pallido, ca. 1.2 mm. longo, 0.5 mm. lato, apice truncato, cum lamina conterminante.

Luzon, prov. Sorsogon, Mt. Bulusan, alt. 250 m., *Elmer* no. 16234.

Dennstaedtia philippinensis Copel. n. sp.

Rhizomate repente, valido; stipitibus proximis, 1-2 m. altis, 2-3 cm. crassis, rhachibusque majoribus fusco-castaneis, asperis; fronde 1.5-2 m. alta, ovata, quadripinnatifida; pinnis inframedialibus 0.7-0.9 m. longis, 25 cm. latis, brevi-stipitatis (1 cm.), pseudoarticulatis, acuminatis; pinnulis brevi-stipitatis (1-2 mm.) vel subsessilibus, utroque latere 30-35, usque ad 13 cm. longis, 3.5-4.5 cm. latis, lineari-oblongis, acutis vel acuminatis, rhachi

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(adspectu inferiore) anguste alata; pinnulis II oblongis, truncatis, basi obliquis, usque ad 9 mm. latis, fere ad costam pinnatifidis; segmentis utroque latere ca. 5, denticulatis, herbaceis, inferne glabris, superne advenas minute et sparse albo-setiferis, infimo acroscopico excepto unisoriferis; soro supra basin sinus inserto, parvo, indusio fisso-cupuliforme.

Luzon, prov. Sorsogon, Mt. Bulusan, *Elmer* no. 16452; Mt. Maquiling, prov. Laguna, alt. 700 m., *Elmer* no. 17534, type. Basilan, *Reillo*, Bureau of Science no. 16220.

Related to *Dennstaedtia flaccida* (*Forst.*) *Bernh.*, as to the exact nature of which I am in doubt. Javan plants known by this name have usually smooth and often stramineous rachises, with smaller and much fewer primary and secondary pinnules. The mount Maquiling plant has most ample fronds. That from Bulusan is narrower thruoghout, and that from Basilan so much narrower as to suggest that it is distinct; but the collected material of the last is not a complete frond and may not be representative. The two southern collections differ again from the type in that the upper surface of the frond is considerably darker in color.

Cyathea bicolana Copel. n. sp.

Species *Cyathea integrae* et *Cyathea philippinensi* affinis; trunco 1.5-3 m. alto, 7.5 cm. crasso; ut videtur ex notis *Elmori*, fronde ca. 150 cm. alta, supra mediam latissima, pinnis usque ad caput trunci decurrentibus et ibidem valde contractis, stipite inde breve et ad truncum appresso, 3.5 cm. crasso, murino, paleis ochroleucis et griseis vestito; rhachi valida, sordide brunnea, deorsum minute asperula superne squamulis obscuris et aliis pallidis anguste linearibus subciliatis 5-8 mm. longis vestita, alibi glabrescente; pinnis majoribus 25 cm. longis, 9 cm. latis, patentibus vel subhorizontalibus, sessilibus, acuminatis, rhachi superne appresso-fusco-velutina, inferne glabrescente; pinnulis proximis, subsessillibus, 4.5 cm. longis, 1 cm. latis, acutis, ad basin pinnatis, costa inferne paleis parvis pallidis ciliatis linearibus ad basin dilatatis in alias minores bullatas apiculatas transeuntibus haud dense vestita; segmentis utroque latere ca. 9, oblongis, oblique truncatis, ca. 3.5 mm. latis, fere integris, charteceis, inferne olivaceis, superne fere nigris; venis deorsum bullato squamuliferis, sursum setiferis, venulis utroque latere 3 vel 4, plerisque furcatis; soris inframedialibus, magnis, indusio castaneo, persistente.

Luzon, prov. Sorsogon, Mt. Bulusan, alt. 840 m., *Elmer* no. 16528, type; ibid, alt. 900 m., *Elmer* no. 17069; prov. Camarines, Mt. Isarog, alt. 594 m., *Ramos*, Bureau of Science no. 22014.

The scales on the basal part of the costa are longer on Mt. Bulusan specimens and more bullate on that from Mt. Isarog; otherwise there are no apparent differences. *Cyathea philippinensis Bak.* is more lax and more coriaceous, with smaller fronds and very much denser pubescence.

Cyathea bulusanensis Copel. n. sp.

Cyathea gregis *Cyathea integrae J. Sm.*; trunco 1.5-2.5 m. alto, 5-7.5 cm. crasso, sordide fusco, sursum spinescente; stipite ca. 45 cm. longo, praecique deorsum paleis minoribus avellanis cum albidis angustissimis ca. 1 cm. longis intermixtis vestito, ubique spinoso; frondibus horizontalibus et recurvatis; fronde ut videtur ovata, utrinque angustata, 80 cm. lata, rachi castanea, deorsum spinosa, sursum inerme, minute stellato-squamulifera vel (linea ventrale excepta) glabrescente; pinnis stipitulatis (stipitulis 2-2.2 cm. longis), maximis inframedialibus 45 cm. longis, 50 cm. latis, abrupte acuminatis; rhachibus costique squamulis minutissimis laciniatis sparsis et paleis albis linearibus paucis vestitis, superne atropurpureo-velutina; pinnulis suprabasalibus maximis, horizontalibus, elliptico-linearibus, 2 cm. latis, cordatis, subacuminatis. ⅔ ad costam pinnatifidis, costa inferne atrocastanea; segmentis 7 mm. latis, oblique truncatis, serratis, lamina papyraceo-chartacea, inferne olivacea, superne atroviride nitida; venula infima inferiore costa pinnula excurriente, venulis aliis utroque latere ca. 5, supremis exceptis furcatis; soris margini quam costa propioribus; indusio mox disrupto et in forma cupulae profunde fissae hyalinae subpersistente.

Luzon, prov. Sorsogon, Mt. Bulusan, alt. 500 m., *Elmer* no. 16670.

Different from all other species of its group in the character of the pubescence, and recognizable with the naked eye by the ample, serrate segments.

Haplodictyum heterophyllum Presl Epim. p. 50, 51.

The type was collected in Samar. *Mr. Elmer* has collected this plant on Mt. Bulusan, Sorsogon province, altitude of 800 meters, number 16585, and has also a single plant from altitude of 600 meters. From the same province, lake Polog, altitude of 500 meters, it has been brought in by *Ramos*, Bureau of Science number 23622. The dimorphism is less

complete than previous descriptions indicate, forking and eventual anastomosis of veinlets occurring sometimes in fertile fronds, as well as more constantly in sterile ones.

Haplodictyum majus Copel. n. sp.

Praecedenti affine, frondibus ultra 20 cm. longis, pinnis inferioribus pluribus liberis, dilatatis et elongatis, pinnatifidis, parte superiore frondis $\frac{1}{2}$-$\frac{2}{3}$ ad costam pinnatifida.

Luzon, prov. Mountain, Apayao, *Ramos*, Bureau of Science no. 13992.

Long and short hairs are mixed on the surface of both species, but the long hairs are less abundant on *Haplodictyum majus.*

It is desirable that such very large genera as *Dryopteris* be made definable by the removal of species aberrant in the characters used for definitions. If this plant be treated as *Dryopteris* (Cf. *Christensen's* Index, p. 255), the definition of the genus becomes inconveniently and unnecessarily difficult. Nevertheless, it is nearly related to the group of *Drypteris canescens*, most apparently to *Dryopteris bakeri* (*Harr.*) *Copel.*, which certainly is not true of *Pleocnemia.* It can therefore be called *Pleocnemia* only by adopting the utterly antiquated view that conformity to a brief diagnosis is more important in classification than is real relationship. The obvious third course is to follow *Presl* and *Fée*, in regarding *Haplodictyum* as a group which it is proper and convenient to recognize as a genus.

Athyrium ebenirachis Copel. n. sp.

Caudice erecto, ca. 60 cm. alto, crasso; stipite ca. 80 cm. alto, 5 cm. crasso, spinis parvis sparsis horrido, deorsum paleis lanceolatis fuscis 6 mm. longis ornato; fronde ca. 1 m. alta, late ovata, acuminata, tripinnatifida, apice pinnatifida, rhachi nigra spinulosa squamulosa subglabrescente; pinnis infimis 20 cm. longis stipitatis horizontalibus utrique angustatis, maximis medialibus fere 40 cm. longis, brevissime stipitatis et rhachin frondis versus paullo angustatis, acuminatis, rhachibus nigris ubique sparse squamulosis; pinnulis suprabasalibus ca. 9 cm. longis, 2 cm. latis, sessilibus, valde acuminatis, basi truncatis, $\frac{2}{3}$-$\frac{3}{4}$ ad costam pinnatifidis, costis inferne sparse castaneo-squamulosis; segmentis ca. 3.5 mm. latis, obtusis, subintegris, interdum falcatis, chartaceis, inferne pallidioribus; venulis 4-6-paribus, simplicibus; soris costularibus non ad marginem attingentibus, infima acros-

copica excepta asplenioideis, indusio castaneo integro, in vetustate lacerato.

Luzon, prov. Sorsogon, Mt. Bulusan, alt. 600 m., *Elmer* no. 16675.

Related to *Athyrium silvaticum* (*Blm.*) *Milde* of Java, from which it differs in the harsher texture, black-squamulose axes, spiny stipe and main rachis and entire margin.

Athyrium woodwardioides (*Presl*) *Christ*, quoad nomen, was accurately described by *Presl* as having forked veinlets; its axes are dark, but naked; and I would not call it herbaceous, but rather at least papyraceous. *Diplazium brevisorum J. Sm.*, nomen nudum, *Brachysorus woodwardioides Presl*, and *Athyrium basilare Fée* are all based on the same type, *Cuming* 153. From *Christ's* very brief remarks, especially as to texture, I doubt if the Celebes plant in his hands when he published the name, *Athyrium woodwardioides*, ought to bear it.

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FUNGI FROM THE PROVINCE OF SORSOGON

by

H. Sydow

(Berlin, Germany)

The fungi described or enumerated in the following pages have all been collected by *Mr. A. D. E. Elmer* in the vicinity of Irosin, Province of Sorsogon, Luzon. A large percentage of them proved to be new, and even two new genera were found.

Meliola acrotricha Syd. nov. spec.

Amphigena, plerumque hypophylla, plagulas orbiculares vel irregulares aterrimas velutinas 2-10 mm diam. formans; mycelium rectangulariter ramosum, ex hyphis obscure castaneo-brunneis plerumque rectiusculis sed densissime ramosis et intertextis 7-9 micro crassis compositum; hyphopedia capitata copiosissima, saepe longa serie aequaliter disposita, alternantia vel saepius exacte opposita, oblongo-ovoidea, integra, 20-24 micro longa, cellula superiore rotundata 10-14 micro lata castanea; hyphopodia mucronata etiam copiosa, unilateralia vel opposita, obscure castaneo-brunnea, 18-24 micro longa, basi 6-8 micro crassa; setae peritheciales et myceliales evolutae, eadem forma et magnitudine, rectae vel subrectae, simplices, rigidae, 220-400 micro longae, ad basim 10-13 micro crassae, tota longitudine opacae, ad apicem semper acute acuminatae; perithecia globosa, 150-200 micro diam.; asci fugaces, 2-3-spori;

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sporae oblongae vel ellipsoideo-oblongae, utrinque late rotundatae, 4-septatae, ad septa non vel parum constrictae, obscure castaneo-brunneae, 35-42 micro longae, 16-18 micro latae.

On leaves of *Trigonachras membranacea Radlk.*, Irosin, June 1916, no. 16426.

Meliola Alocasiae Syd. nov. spec.

Hypophylla, gracilis, plagulas tenues arachnoideas orbiculares 2-5 mm diam. parum conspicuas formans; mycelium laxum, ex hyphis rectiusculis vel leniter undulatis longiusculis castaneo-brunneis 5-6 micro crassis septatis (articulis 30-40 micro longis) laxe ramosis compositum; hyphopodia capitata modice copiosa, semper solitaria, alternantia, gracilia, oblongo-ovata vel piriformia, integra, 18-24 micro longa, cellula superiore 9-11 micro lata; hyphopodia mucronata solitarie dispersa vel alternantia, 15-20 micro longa, ad basim 5-7 micro crassa, dilutiora; setae mycelicae modice copiosae, praecipue ad basim peritheciorum ortae, simplices, rectae vel subrectae, tota longitudine opacae vel ad apicem paullo dilutiores, septatae, 200-350 micro longae, ad basim 8-10 micro crassae, ad apicem semper obtusae; perithecia pauca in quaque plagula, globosa, 100-150 micro diam., levia; asci fugaces, 2-3-spori; sporae oblongae, 4-septatae, vix vel parum constrictae, brunneae, utrinque rotundatae, 25-30 micro longae, 10-11 micro latae.

On leaves of *Alocasia vulcanica Elm.*, Irosin, June 1916, no. 16333.

Meliola amadelpha Syd. nov. spec.

Hypophylla, plagulas haud determinatas sed plus minusve effusas confluentes densas valde velutinas atras pelliculosas saepe magnam folii partem obtegentes formans; mycelium dense intertextum, ex hyphis dense breviterque ramosis undulatis castaneo-brunneis 4-5 micro crassis compositum; hyphopodia capitata sparsa, plerumque solitaria, usque 26 micro longa, cellula basali plus minusve longa stipitiformi, apicali semper valde lobata 20-24 micro lata;

hyphopodia mucronata rara, opposita, lageniformia, ca. 18 micro longa; setae myceliales numerosae, rectae, tota longitudine opacae, septatae, 270-350 micro longae, basi 6-8 micro crassae, simplices et obtuse attenuatae vel ad apicem brevissime bidentatae, dentibus circiter 2-5 micro longis; perithecia in mycelio denso sine ordine disposita, globosa, 175-200 micro diam.; asci fugaces, 2-3-spori; sporae oblongae, utrinque rotundatae, castaneo-brunneae, 4-septatae, ad septa plus minusve constrictae, 45-50 micro longae, 16-19 micro latae, cellulis subaequalibus; mycelium conidiiferum simul praesens, in ramis ascendentibus plus minus undulatis septatis (articulis 20-30 micro longis) 4-5 micro crassis vel saepe etiam in setis propriis conidia generans; conidia subfusoidea, fuliginea, 2-3-septata, 35-45 micro longa, ad septa non vel parum constricta, cellulis singulis valde inaequalibus, basali stipitiformi 5-8 micro longa et ca. 4-5 micro crassa, apicali conico-acuta 10-12 micro longa et inferne 4-5 micro crassa, media (in conidiis biseptatis) multo majore 20-26 micro longa et 6-9 micro crassa; haec cellula media saepe iterum septo transversali divisa, quo modo conidia 3-septata evadunt.

On leaves of a palm, Irosin, July 1916, no. 16689.

Although the species in many respects resembles *Meliola palmicola Wint.*, especially in the setae, spores and conidial stage, yet it must undoubtedly be considered distinct. It is quite different in external appearance, as it forms thick, velvety, effused and confluent pellicles which are easily separable from the leaf, and which often occupy a considerable part of the lower leaf blade. There is no dentritical margin to be seen, as the mycelium only forms short densely interwoven branches which are entirely beset by the setae and conidia bearing branches. In *M. palmicola,* however, the patches are mostly small, not exceeding 1.5 cm in diameter; they are thin and araneous, with a distinct dentritical margin. There is another difference in the shape of the capitate hyphopodia, which are always much and deeply lobed in the new species but only seldom more or less lobed in *M. palmicola.*

7 **Meliola Ardisiae** *Syd.* nov. spec.

Amphigena, plagulas tenues orbiculares vel irregulares 2-10 mm diam. formans; mycelium ex hyphis rectiusculis obscure castaneo-brunneis ramosis anastomosantibusque septatis (articulis 20-25 micro longis) 6-9 micro crassis compositum; hyphopodia capitata modice copiosa, sparsa vel alternantia, 18-22 micro longa, cellula superiore fere semper integra 9-12 micro lata plerumque introrsum curvata; hyphopodia mucronata rara, solitaria vel opposita, usque 24 micro longa, basi 8-11 micro crassa, ad apicem obtuse attenuata vel etiam rotundata; setae mycelii sat numerosae, rectae, rigidae, 450-600 micro longae, ad basim 9-12 micro crassae, sive tota longitudine aterrimae et ad apicem acutae, sive in superiore parte plus minus pellucide brunneae et minus acutae vel saepe etiam obtusae; perithecia sparsa, globosa, 150-200 micro diam., verrucosa; asci fugaces, 2-3-spori; sporae oblongae, utrinque obtusae, 4-septatae, ad septa valde constrictae, castaneo-brunneae, 42-52 micro longae, 12-15 micro latae; conidia simul praesentia fusoidea, 9-12-septata, non constricta, fuliginea.

On leaves of *Ardisia Jagorii Mez,* Irosin, September 1916, no. 17327.

7 **Meliola Bruguierae** **Syd.** nov. spec.

Hypophylla, plagulas orbiculares 2-6 mm diam. atras formans; mycelium densissime intertextum, ex hyphis undulatis valde ramosis et anastomosantibus 7-8 micro crassis obscure castaneo-brunneis compositum; hyphopodia capitata alternantia vel saepius opposita, 16-20 micro longa, ovata vel oblonga, haud raro curvata, integra vel subintegra, cellula superiore 8-11 micro lata; hyphopodia mucronata non visa; setae mycelicae numerosae, 600-1100 micro longae, ad basim 9-11 micro crassae, simplices, biformes: aliae inferne aterrimae apicem versus castanee tinctae et obtuse vel subinde etiam acutiuscule attenuatae; aliae basi tantum opacae et in superiore parte pallide brunneae omnino pellucidae et late rotundatae vel truncatae; perithecia modice copiosa, globosa, verrucosa, 180-260 micro diam., in sicco collapsa; asci fugaces, 2-3-spori; sporae ellipsoideo-oblongae, 4-septatae, parum constrictae, obtusae, 36-42 micro longae, 18-21 micro latae, obscure castaneo-brunneae.

On leaves of *Bruguiera eriopetala W.* et *A.*, Irosin, July 1916, no. 16775.

Meliola calochaeta Syd. nov. spec.

Hypophylla, plagulas minutas orbiculares 2-4 mm diam. atras formans; mycelium densissime intertextum, ex hyphis obscure castaneo-brunneis 6-8 micro crassis dense breviterque ramosis et anastomosantibus compositum; hyphopodia capitata copiosa, dense disposita, plerumque alternantia, 15-20 micro longa, cellula superiore 9-11 micro crassa, integra vel subintegra; hyphopdia mucronata non visa; setae plerumque ad basim peritheciorum ortae, 250-350 micro longae, ad basim 10-12 micro crassae, tota longitudine opacae, atrae, ad apicem in ramos duos primarios 20-70 micro longos patentes vel recurvatos divisae; rami primarii ad apicem sive breviter bi-trifurcati (furcis 8-20 micro longis) vel subinde etiam iterum in ramulos duos secundarios ad apicem bi-trifurcatos divisi; perithecia pauca in quaque plagula, aterrima, globosa, 150-200 micro diam.; asci fugaces, 2-3 spori; sporae oblongae, 4-septatae, vix vel leniter constrictae, utrinque rotundatae, obscure castaneo-brunneae, 40-44 micro longae, 17-22 micro latae.

On leaves of *Cryptocarya Foxworthyi Elm.*, Irosin, September 1916, no. 17331.

This species is very interesting by its characteristic setae. These are divided above into two more or less long primary and spreading branches, which in their turn, are shortly two-or trifurcate at their top. Sometimes, however, the primary branches are producing two more or less long secondary branchlets, and then the latter are two-or trifurcate at their ends.

Meliola commixta Syd. nov. spec.

Hypophylla, plagulas orbiculares 2-5 mm diam. vel confluendo irregulares aterrimas velutinas formans; mycelium densissime intertextum, ex hyphis castaneo-brunneis 7-10 micro latis copiosissime breviterque ramosis septatis torulosis rete densissimum formantibus compositum; hyphopodia capitata parca, rudimentaria, brevia, ob ramulos numerosissimos aegre perspicua; setae myceliales copiosissimae, erectae, tota longitudine opacae, atrae, 200-250 micro longae, ad basim 9-11 micro crassae, ad apicem variabiles, sive integrae attenuatae vel obtusae, sive ut plurimum brevissime 2-3-denticulatae, dentibus 2-3 micro tantum longis; perithecia numerosa, globosa, astoma, 150-175 micro diam.; asci fugaces, 2-3-spori; sporae oblogae, 4-septatae, ad septa leniter constrictae, rotundatae, brunneae, 36-40 micro longae, 11-14 micro latae.

On leaves of *Nephelium mutabile Bl.*, Irosin, April 1916, no. 15686.

This species is quite different from *Meliola Nephelii Sacc.* (see Bull. dell' Orto Bot. della R. Univ. di Napoli VI, 1918, p. 42) which has numerous hyphopodia but no setae, and therefore belongs to *Irene*. *Saccardo* says in his description that the colonies of *M. Nephilii* are somewhat velutinous. This, however, is by no means the case, and cannot be, as no setae are formed.

Meliola irosinensis Syd. nov. spec.

Amphigena, plerumque epiphylla, plagulas minutas orbiculares 2-4 mm diam. dein plus minusve confluentes et majores subvelutinas aterrimas formans; mycelium ex hyphis densissime intertextis copiose breviterque ramosis anastomosantibus obscure castaneo-brunneis 7-10 micro crassis septatis formatum; hyphopodia capitata copiosissima, alternantia vel subinde opposita, semper integra, ovata vel oblongo-ovata, 16-20 micro longa, cellula superiore 8-12 micro lata, inferiore brevi; hyphopodia mucronata non visa; setae myceliales numerosae, simplices, rectae vel subrectae, tota longitudine atrae opacae vel rarius summo apice leniter dilutiores, obtuse attenuatae, 250-300 micro longae, basi 8-12 micro latae; perithecia modice copiosa, 150-200 micro diam.; asci fugaces, 2-3-spori; sporae oblongae, utrinque rotundatae, obscure castaneo- brunneae, 4-septatae, leniter constrictae, 40-44 micro longae, 16-20 micro latae.

On leaves of *Boerlagiodendron*, probably *B. mindanaense Merr.*, Irosin, December 1915, no. 14526.

Meliola odontocephala Syd. nov. spec.

Epiphylla, plagulas minutas discretas orbiculares 1-4 mm diam. atras tenues formans; mycelium rectangulariter ramosum, ex hyphis castaneo-brunneis septatis 5-6 micro crassis plerumque rectis compositum; hyphopodia capitata copiosissima, opposita et saepe longa serie disposita, rarius solitarie alternantia, semper integra, recta, cylindracea, 14-18 micro longa, 6-7 micro lata, obtusa; hyphopodia mucronata multo rariora, 20-22 micro longa, ad basim 5-6 micro crassa; setae myceliales numerosae, rectae, 150-250 micro longae, basi 7-8 micro crassae, tota longitudine pellucidae vel inferiore parte subopacae, pluriseptatae, cellula ultima ad apicem leniter dilatata et dentes 3-6 erectos ca. 2-7 micro longos gerente; perithecia sparsa, globosa, 130-150 micro diam.; asci fugaces, 2-spori; sporae oblongae, 4-septatae, leniter constrictae, castaneo-brunneae, rotundatae, 40-45 micro longae, 14-16 micro latae, cellulis aequalibus.

On leaves of *Harpulia arborea (Bl.)*, Irosin, August 1916, no. 17012.

Meliola pumila Syd. nov. spec.

Amphigena, plagulas minutas 1-2 mm diam. orbiculares vel irregulares parum conspicuas formans; mycelium ex hyphis brevibus densissime intertextis obscure castaneo-brunneis 5-7 micro crassis copiose ramosis anastomosantibusque compositum; hyphopodia capitata numerosa, 16-20 micro longa, cellula superiore 8-11 micro lata plerumque globulosa et integra subinde etiam irregulari; hyphopodia mucronata non visa; setae mycelii modice copiosae, rectae, simplices, inferne atrae opacae, apicem versus saepe dilutiores, obtusae, 175-240 micro longae, ad basim 6-8 micro crassae; perithecia sparsa, globulosa, 100-150 micro diam.; asci fugaces, bispori; sporae oblongae, utrinque rotundatae, 4-septatae, vix vel parum constrictae, obscure castaneo-brunneae, 28-34 micro longae, 12-14 micro latae.

On leaves of *Boea pseudoglandulosa Elm.*, Irosin, September 1916, no. 17411.

Meliola uncinata Syd. nov. spec.

Hypophylla, plagulas orbiculares ca. 1 cm diam. vel subinde confluendo majores aterrimas velutinas formans; mycelium dense intertextum, ex hyphis obscure castaneo-brunneis rectiusculis sed copiosissime breviterque ramosis saepe anastomosantibus septatis 7-9 micro crassis compositum; hyphopodia capitata copiosa, plerumque alternantia, subinde opposita, piriformia, integra, 20-24 micro longa, cellula superiore rotundata 10-12 micro lata; hyphopodia mucronata rara, ca. 22 micro longa, basi 7-8 micro crassa; setae mycelicae copiosissimae, 250-340 micro longae, ad basim 9-12 micro crassae, tota longitudine atrae opacae, superne semper valideque uncinatae, ad apicem acutiuscule vel subinde obtuse attenuatae; perithecia sparsa, globosa, 160-200 micro diam., in sicco collapsa; asci fugaces, 2-3-spori; sporae oblongae, utrinque rotundatae, 4-septatae, ad septa constrictae, obscure castaneo-brunneae, 42-46 micro longae, 12-16 micro latae, loculis aequalibus.

On leaves of *Horsfieldia gigantifolia Elm.*, Irosin, September 1916, no. 17222.

This species comes very near to *Meliola hamata Syd.*, from which it especially differs by the somewhat smaller perithecia, setae and spores.

Mycosphaerella Cassiae Syd. nov. spec.

Maculae distinctae, orbiculares vel irregulares, venulis folii limitatae, 0.5-1 cm diam., superne griseae vel albido-griseae, inferne brunneolae, atrobrunnee marginatae; perithecia amphigena, gregaria, subepidermalia, globulosa, 70-110 micro diam., pariete ca. 12-16 micro crasso e cellulis flavo-olivaceis vel brunneolis 4-6 micro diam. circa porum minoribus et obscurioribus contexto, papillata, poro ca. 15-18 micro lato pertusa; asci fasciculati, sessiles, irregulares, oblongi vel saepius saccati, 28-36 micro longi, 8-11 micro lati, octospori; paraphysoides paucae; sporae di-tristichae, fusoideae, utrinque attenuatae, medio septatae, non constrictae, 14-16 micro longae, 2- 2. 5 micro latae.

On living leaves of *Cassia alata L.*, Irosin, November 1915, no. 15193.

Mycosphaerella leucospila Syd. nov. spec.

Maculae distinctae, amphigenae, primitus in epiphyllo minutae orbiculares 2-3 mm diam. brunneolae sed mox candidae vel niveae et anguste brunneolo-marginatae, in hypophyllo majores usque 1 cm diam. et haud distincte marginatae rufo-brunneae tandem centro etiam albicantes vel ochraceae; perithecia in epiphyllo tantum conspicua, pauca vel pluria in quaque macula, gregaria, subepidermalia, usque ad medium folii crassitudinis attingentia, globulosa, 80-110 micro diam., contextu brunneo parenchymatice e cellulis ca. 4-5 micro diam. composito; asci sessiles, oblongi vel obclavato-saccati, ad apicem crasse tunicati 40-45 micro longi, 11-12 micro crassi, octospori; paraphysoides paucae; sporae plerumque distichae vel (in ascis saccatis) inferne tristichae, oblongae vel oblongo-clavulatae, medio 1-septatae, non constrictae, hyalinae, utrinque obtusae vel uno fine late rotundatae, altero obtuse attenuatae, 15-18 micro longae, 3.5-4 micro latae.

On living leaves of *Ficus celebica Bl.*, Irosin, April 1915, no. 15025.

In mature specimens the spots caused by the fungus are quite white and very conspicuous.

Leptosphaeria Panici Syd. nov. spec.

Perithecia laxe gregaria, per folium irregulariter sparsa vel saepius pauca aut pluria laxe congregata, maculis propriis nullis vel flavidis insidentia, in mesophyllo folii omnino immersa, denique papillula tantum per epidermidem prorumpentia, applanato-globosa, 140-180 micro diam., poro 20-30 micro lato pertusa, membranacea, pariete ca. 10-14 micro crasso, e pluribus stratis cellularum flavo-brunnearum vel dilute brunneolo-olivacearum 4-5 micro latarum contexto; asci sessiles vel brevissime stipitati, cylindraceo-clavati, 50-70 micro longi, 14-17 micro crassi, octospori, ad apicem rotundati, copiose paraphysati; sporae distichae, fusiformes, utrinque leniter attenuatae, 3-septatae, vix vel parum constrictae, intense olivaceae, 20-26 micro longae, 4-5 micro crassae, cellula secunda superiore subinde lenissime majore.

On dead leaves of *Panicum palmatifolium Konig*, Irosin, December 1915, no. 14629.

Melanops peregrina Syd. nov. spec.

Stromata epiphylla, epidermide denigrata tecta, tubercula duriuscula leniter convexa ambitu semper exacte orbicularia 2-4 mm lata e matricis substantia transformata et stromate proprio composita gignentia, superficie ob papillulas subconoideas peritheciorum dense punctata; perithecia omnino immersa, monosticha vel fere monosticha, globulosa, densiuscule stipata, sed fere semper omnino discreta, 150-200 micro diam., pariete e cellulis 8-10 micro diam. composito, ca. 20-30 micro crasso, ad verticem plerumque crassiore, nucleo albo; asci clavati vel clavato-saccati, breviter stipitati, ad apicem rotundati, 65-75 micro longi, 18-21 micro lati, sat numerosi; sporae distichae, ellipsoideae vel ovato-oblongae, utrinque rotundatae vel basim versus paullo attenuatae, continuae, hyalinae, 18-20 micro longae, 8-9 micro latae.

On leaves of *Medinilla epiphytica Merr.*, Irosin, June 1916, no. 16379.

Trabutia irosinensis Syd. nov. spec.

Maculae nullae vel fere nullae; stromata subcuticularia, semper epiphylla, irregulariter in greges 0.5-2 cm diam.

disposita, sive laxe sive densiuscule aggregata et subinde confluentia, ambitu irregularia, plerumque 0.5-1 mm diam., rarius confluendo majora, 1-paucilocularia, convexa, opaca, contextu prosenchymatico ex hyphis rufo-brunneis ca. 3-4 micro latis composito; loculi ca. 250-350 micro lati, 100-150 micro alti, clypeo aterrimo 25-40 micro crasso; asci clavato-cylindracei, 50-80 micro longi, 15-20 micro lati, octospori, paraphysati; sporae plerumque distichae, ovato-oblongae vel ellipsoideo-oblongae continuae, rotundatae, hyalinae, 12-15 micro longae, 6-7 micro crassae.

On leaves of *Ficus paloensis Elm.*, Irosin, October 1915, no. 14793.

A typical member of the genus, as it is very clearly to be seen that the stromata are developed between the cuticle and the epidermis. It differs from other species living on figs especially by the comparative slender hyphae of the stromatical tissue.

Trabutia neurophila Syd. nov. spec.

Stromata epiphylla, saepissime etiam in petiolis evoluta, in hypophyllo non conspicua, saepe maculis rufo-fuscis praecipue in hypophyllo conspicuis insidentia, sed haud raro etiam sine maculis, ut plurimum ad nervos primarios vel secundarios evoluta, variae magnitudinis, 0.5-2 cm longa. aterrima, multilocularia, subcuticularia; loculi 300-450 micro longi, 150-200 micro alti, strato basali ca. 10-15 micro crasso; asci clavati, 60-80 micro longi, 10-15 micro lati, octospori, paraphysati; sporae distichae, ellipsoideae vel oblongo-ellipsoideae, utrinque rotundatae, continuae, primitus hyalinae, dein plus minus intense ochraceae, 11-14 micro longae, 5-7 micro latae.

On leaves and petioles of a *Ficus*, possibly *Ficus repandifolia Elm.*, Irosin, September 1916, no. 17232.

A considerable number of *Trabutias* growing on figs are already known, from most of which the new species differs considerably. It is especially remarkable by the shape of the stromata and the color of the spores. The former are developed on the upper side of the leaves where they nearly always occupy the primary or the secondary veins, and, in growing on, they strictly follow the veins. Only a few and small stromata are to be found on the leaf-blade. Often, however, they also occupy the petioles. The spores are of the usual size and shape, and hyaline at first, but they soon become more or less ochraceous, a feature which has not been observed in such a high degree in other *Trabutias*.

7 **Trabutia pacifica Syd.** nov. spec.

Stromata semper hypophylla, sine maculis, plerumque plus minus copiose in greges usque 1 cm diam. densiuscule disposita, haud raro plura minora et saepe sterilia unum centrale majus circulariter ambientia, usque 1 mm diam., non vel vix confluentia, plerumque 1-locularia, subcuticularia, sed basi plana in epidermide immersa; loculi 400-600 micro lati, 200-300 micro alti, clypeo 40-60 micro crasso aterrimo; contextus stromatum ex hyphis percrassis brunneolis 5-7 micro latis compositus; asci late clavati, 75-90 micro longi, 18-22 micro lati, copiose paraphysati, octospori; sporae oblongo-ovatae vel ellipsoideo-ovatae, continuae, hyalinae, utrinque obtusae, 15-17 micro longae, 7-8 micro latae.

On leaves of *Ficus pacifica Elm.,* Irosin, May to June 1916, nos. 16135 and 16402.

The stromata of this species are developed under the cuticle, but in the cells of the epidermis. This is the first fig inhabiting *Trabutia* which is growing on the nether side of the leaves.

7 **Catacauma egenulum Syd.** nov. spec.

Maculae parum conspicuae, indeterminatae, flavo-brunneolae vel fere nullae; stromata hypophylla, singula subinde etiam epiphylla, plerumque autem in epiphyllo stromata minuta sterilia tantum contraposita evoluta, orbicularia, plus minus dense disposita, sed discreta, 200-500 micro diam., in centro alte convexa, semper unilocularia; loculi

200-300 micro lati, in centro usque 170 micro alti, clypeo epidermali aterrimo 20-30 micro crasso; asci subsessiles, saepe irregulares, saccati vel clavato-saccati, 50-80 micro longi, 16-20 micro lati, paraphysati, octospori; sporae distichae, anguste ellipsoideae vel oblongae, continuae, rectae vel leniter inaequilaterales, hyalinae, 20-24 micro longae, 6-8 micro latae.

On leaves of *Eugenia Everettii C. B. Rob.*, Irosin, August 1916, no. 17068 ex p.

Catacauma Strychni Syd. nov. spec.

Stromata in utraque foliorum pagina visibilia, sine maculis vel partibus foliorum leniter decoloratis insidentia, plerumque circulariter in orbes 5-10 mm latos densiuscule disposita, singula minuta, 0.5-1 mm diam., haud raro confluentia, unilocularia vel confluendo 2-3-locularia, aterrima, in epiphyllo nitida, convexa, ex hyphis ca. 3-4 micro crassis opacis contexta, clypeo epidermali epiphyllo opaco 25-30 micro crasso, in hypophyllo stromata contraposita plerumque sterilia evoluta; loculi 300-550 micro lati, 150-250 micro alti, hypothecio hyalino vel subhyalino ca. 10-15 micro crasso; asci clavati, ad apicem rotundati, longe pedicellati, p. sp. 70-85 micro longa, 19-22 micro crassa, octospori, parce paraphysati; sporae oblique monostichae usque distichae, oblongo-ellipsoideae, continuae, obtusae, hyalinae, 19-22 micro longae, 7-9 micro latae.

On leaves of *Strychnos multiflora Benth.*, Irosin, April 1916, no. 15889.

Schizochora stenosperma Syd. nov. spec.

Stromata hypophylla, sine maculis, sparsa et solitaria vel bina trina aggregata, sed non vel parum confluentia, minuta, 300-600 micro diam., convexa, opace atra, rotundata, 1-vel rarius paucilocularia, basi plana in epidermide immersa, contextu violaceo-brunneo verticali-prosenchymatico (hyphis ca. 3-3. 5 micro crassis); loculi 160-300 micro lati, 110-160 micro alti, clypeo 20-30 micro crasso; asci fusoideoclavati, plerumque utrinque leniter attenuati, teneri, 45-52 micro longi, 9-13 micro lati, octospori, filiformiter paraphysati; sporae tristichae, rarius 4-stichae, anguste fusoideae, continuae, hyalinae, utrinque acutissimae vel potius appendicula filiformi usque 6 micro longa instructae, 22-24 micro longae (sine appendiculis), 3-4 micro latae vel appendiculis inclusis usque 34 micro longae.

On leaves of *Ficus minahassae Miq.*, Irosin, October 1915, no. 14476.

Camarotella Triphasiae *Syd.* nov. spec.

Stromata hypophylla, maculis vel vix conspicuous fuscidulis insidentia, sparsa, solitaria,, 0.5-1 mm diam., orbicularia, convexa, subcuticularia, semper loculum centralem unicum includentia; loculus 200-400 micro latus, 150-200 micro altus, strato basali ca. 10 micro crasso brunneolo, clypeo aterrimo 20-30 micro crasso; asci cylindracei, obtusi, breviter pedicellati, 70-85 micro longi, 12-15 micro crassi, octospori; paraphyses copiosissimae, filiformes, 1 micro crassae; sporae distichae, clavulatae, ad apicem late rotundatae, basim versus semper attenuatae, 3-septatae, non constrictae, hyalinae, 22-28 micro longae, 6-7 micro crassae, cellulis tribus superioribus fere aequalibus, inferiore longiore sed angustiore.

On living leaves of *Triphasia trifoliata DC.*, Irosin, July 1916, no. 16571.

Ophiodothella trichocarpa Syd. nov. spec.

Maculae distinctissimae, amphigenae, semper orbiculares, 3-8 mm diam., albido-ochraceae, linea angusta elevatula brunneola marginatae; stromata epiphylla, in maculis laxe gregaria, in mesophyllo folii sita et plerumque 2/3 vel 3/4 folii crassitudinis occupantia, convexa, atra, nitidula, 250-400 micro diam., semper unilocularia, clypeo epidermali 20-25 micro crasso atro, in hypophyllo non vel vix evoluto; asci cylindracei, teneri, breviter pedicellati, 70-80 micro longi, 3-4 micro crassi, aparaphysati; sporae parallele positae, ascorum fere longitudine, filiformes, vix 0.75 micro crassae, hyalinae.

On leaves of *Dracontomelum Cumingianum Baill.*, Irosin, June 1916, no. 16236.

Ellisiodothis Elmeri Syd. nov. spec.

Stromata superficialia, irregulariter distributa, sparsa vel hinc inde aggregata, 300-500 micro diam., orbicularia, disciformia, atra, opaca, mycelio libero destituta, ex hypostromate epidermali parco oriunda, radiatim ex hyphis castaneo-brunneis 3-4 micro crassis contexta, plerumque 1-locularia, hypothecio hyalino fibroso; loculi 150-200 micro lati, 70-80 micro alti, strato tegente 20-25 micro crasso aterrimo poro rotundo disrumpente; asci clavato-saccati, breviter crasseque stipitati, crasse tunicati, 60-85 micro longi, 16-19 micro lati, octospori; paraphyses copiosae, ca. 1 micro crassae; sporae plerumque distichae vel irregulariter distichae, ovatae vel ellipsoideo-ovatae, continuae, utrinque rotundatae, hyalinae, 15-17 micro longae, 7-9 micro latae.

On the sheaths and stems of a *Dendrobium*, section *Aporum*, Irosin, October 1925, no. 14442. Proba

Diathrypton consimile Syd. nov. spec.

Hypophyllum, plagulas atras tenues primitus orbiculares 2-10 mm diam. tandem confluendo saepe irregulares et majores formans; mycelium copiose evolutum, ex hyphis rectiusculis vel subinde leniter torulosis castaneo-brunneis 4-5 micro crassis valde ramosis septatis (articulis 12-20 micro longis) compositum; hyphopodia modice copiosa, dispersa, continua, plerumque cylindracea, 10-12 micro longa et 4-5 micro lata, integra, rarius leniter lobata et tunc saepe latiora quam altiora; setae nullae; perithecia gregaria, ad hyphas mycelii orta, globulosa, astoma, 50-70 micro diam., mollia, tenuiter cellulosa, pariete mox et facillime histolysis ope in cellulas dilute brunneas rotundatas 6-10 micro metientes dissoluto, monoascigera; asci ovato-globosi, 35-45 micro longi, 25-38 micro lati, octospori, aparaphysati; sporae ellipsoideo-oblongae, utrinque rotundatae, medio vel circa medium septatae et valde constrictae, 26-30 micro longae, 15-18 micro latae, atrae, loculis aequalibus vel supero saepe leniter latiore, facillime secedentibus.

On leaves of *Garcinia fragrans Elm.*, Irosin, August 1916, no. 17031.

This species is very nearly related to *Diathrypton amboinense Syd.*, differing especially in the less numerous, dispersed and not opposite somewhat smaller hyphopodia.

Parasterina irosinensis Syd. nov. spec.

Hypophylla, plagulas tenues orbiculares ca. 2-6 mm diam. formans; mycelium modice copiosum, ex hyphis intense castaneo-brunneis rectis vel parum undulatis septatis ramosis 4-6 micro crassis compositum; hyphopodia modice copiosa, solitaria, continua, fere semper valde profundeque lobata, mox altiora quam latiora, mox e contra latiora quam altiora, usque 12 micro alta vel lata; thyriothecia laxe gregaria, orbicularia, 150-180 micro diam., stellatim dehiscentia, radiatim ex hyphis rectis castaneo-brunneis 2-3 micro crassis septatis (articulis 5-10 micro longis) strato simplici contexta; asci ovati vel ovato-globosi, 35-44 micro longi, 25-35 micro lati, octospori, copiose paraphysati; sporae conglobatae, oblongo-ellipsoideae, utrinque rotundatae, medio septatae et plerumque modice constrictae, leves, ex hyalino fuscae, 20-22 micro longae, 8-11 micro latae, loculis aequalibus vel subaequalibus.

On leaves of *Geniostoma Cumingianum Benth.*, Irosin, July 1916, no. 16539.

Prillieuxina pumila Syd. nov. spec.

Hypophylla, plagulas vix determinatas plus minus effusas parum perspicuas griseolas formans; mycelium modice evolutum, ex hyphis undulatis fuscidulis 2-3 micro crassis ramosis saepe anastomosantibus vel longitudinaliter connexis compositum; hyphopodia nulla; thyriothecia crebra, gregaria, rotundata, 150-180 micro diam., stellatim dehiscentia, ad ambitum fimbriata, ex hyphis rectiusculis septatis (articulis 7-12 micro longis) fuscis ca. 2-2.5 micro crassis strato simplici contexta; asci ovato-globosi usque oblongo-ovati, 25-42 micro longi, 20-24 micro lati,, octospori, filiformiter paraphysati; sporae oblongo-ellipsoideae, utrinque obtusae, fuscae, medio septatae et plus minusve constrictae, leves, 18-20 micro longae, 8-9 micro latae, loculis aequalibus vel fere aequalibus.

On leaves of *Horsfieldia gigantifolia Elm.*, Irosin, September 1916, no. 17229.

Echidnodes denigrata Syd. nov. spec.

Hypophylla, plagulas orbiculares ca. 1 cm diam. dein plus minusve confluentes et majores tenues atro-griseas formans; mycelium modice copiosum, ex hyphis sive rectiusculis sive plus minusve undulatis septatis (articulis 15-20 micro longis) fuscidulis vel olivaceo-fuscis 2.5-3 micro latis ramosis compositum; hyphopodia nulla; thyriothecia copiose evoluta, densiuscule dispersa, primitus orbicularia, mox elliptica vel elongata, 300-500 micro longa, 200-250 micro lata, rima longitudinali dehiscentia, radiatim ex hyphis 2.5-3 micro crassis contexta, opaca, aterrima, ambitu copiose fimbriata; asci subglobosi vel ovati, crasse tunicati, 50-70 micro longi, 30-50 micro lati, octospori; paraphyses superne coalitae et epithecium formantes; sporae conglobatae, ellipsoideo-oblongae, medio septatae et leniter constrictae, utrinque late rotundatae, leves, ex hyalino fuscae, 27-30 micro longae, 14-15 micro latae.

On leaves of *Crypteronia laxa Elm.*, Irosin, April 1916, no. 15720.

Peltosoma Syd. gen. nov. (*Pycnothyriearum*)

Pycnostromata unilocularia, superficialia, in mycelio libero sine ordine disposita, radiatim contexta; hyphopodia nulla; conidia phaeophragmia, pedicello brevi hyalino suffulta.

Peltosoma Freycinetia Syd. nov. spec.

Plagulae primitus minutae, usque 1 cm diam., sed mox confluentes et majores, plus minusve effusae et saepe magnam folii partem occupantes, tenues; mycelium sat copiosum, ex hyphis castaneo-brunneis undulatis ramosis et anastomosantibus septatis 3-4 micro crassis haud hyphopodiatis compositum; pycnostromata dense disposita, orbicularia, 150-250 micro diam., stellatim dehiscentia, radiatim ex hyphis obscure castaneo-brunneis saepe subopacis rectiusculis septatis (articulis 4-6 micro longis) 3-4 micro crassis contexta, ambitu copiose fimbriata; conidia haud numerosa, circumcirca ad latera pycnostromatum in apice hypharum brevium hyalinarum solitarie orta, oblongo-clavulata vel potius oblongo-fusiformia, utrinque leniter attenuata, sed apicibus late rotundatis, levia, primitus continua vel 1-septata et hyalina vel pallide colorata, mox autem 3-5-septata et intense castaneo-brunnea vel atro-brunnea, saepe subopaca, 35-50 micro longa, 13-16 micro crassa, ad septa non constricta, loculis valde inaequalibus, duobus mediis plerumque majoribus.

On leaves of *Freycinetia maxima Merr.*, Irosin, October 1915, no. 14701.

The new genus is nearly related to *Asterostomula Theiss.*, and *Leprieurina Arn.*, from which it differs by the pluricellular conidia.

Gloeosporidium Elmeri Syd. nov. spec.

Acervuli amphigeni, plerumque hypophylli, sine maculis, per totam folii superficiem aequaliter densiusculeque distributi vel etiam hinc inde irregulariter aggregati, semper discreti, sub epidermide evoluti, primitus tecti, dein epidermidem disrumpentes, ca. 70-100 micro diam., albidi; conidiophora dense stipata, breviter filiformia, 8-12 micro longa, 1 micro crassa; conidia repetite formata, cylindracea, recta vel leniter inaequilateralia, continua, utrinque obtusa, 14-18 micro longa, 3-4 micro crassa.

On leaves of *Schefflera simplicifolia Merr.*, Irosin, July 1916, no. 16799 (type). Also on leaves of *Schefflera pentaphylla Elm.*, Irosin, October 1915, nos. 14723 and 14724 ex p.

Colletotrichum Elmeri Syd. nov. spec.

Maculae distinctissimae, amphigenae, longe lateque confluentes et vage effusae, usque 30 cm longae, albido-ochraceae; acervuli epiphylli, plus minus dense distributi, 40-80 micro diam., setulis copiosis (15-60 in quoque acervulo) plerumque curvatis opace brunneis 30-60 micro longis basi 3-4 micro crassis ad apicem leniter attenuatis et subinde paullo dilutioribus continuis obsiti; conidia oblonga, continua, obtusa, hyalina, 12-15 micro longa, 4-5. 5 micro lata, sporophoris brevibus suffulta.

On leaves of *Cryptosperma Merkusii* (*Hassk.*), Irosin, April 1916, no. 15663.

Haplomela Syd. gen. nov.

Acervuli subepidermales, minuti, strato basali simplici fibroso minute celluloso hyalino vel subhyalino, stromate centrali deficiente; conidia late ellipsoidea usque subglobosa, continua, fusca, levia; conidiophora simplicia, densissime stipata, bacillari-filiformia.

Haplomela Celtidis Syd. nov. spec.

Acervuli hypophylli, sine maculis, plerumque in greges orbiculares ca. 3-5 mm latos dein saepe confluentes et majores densiuscule dispositi, sed semper discreti, rarius per magnam folii partem plus minus aequaliter distributi, subepidermales, applanato-conoidei, quoad magnitudinem variabiles, ca. 100-200 micro diam., strato basali fibroso-celluloso hyalino vel subhyalino ca. 25 micro crasso, epidermide irregulariter rupta cincti; conidia late ellipsoidea, late ovata vel subglobosa, haud raro etiam leniter angulata, ad basim saepe papillula minutissima praedita, continua, fusca, grossiuscule 1-guttata, 5.5-7 micro longa, 4-5.5 micro lata, levia; conidiophora stratum basale densissime

tegentia, bacillari-filiformia, simplicia, hyalina, 12-18 micro longa, 1.5 micro lata, apicem versus plerumque distincte attenuata.

On leaves of *Celtis multifolia Elm.*, Irosin, June 1916, no. 16310.

Acervuli growing beneath the epidermis, from a more or less circular flat basis truncate conical, very variable in size, consisting of a hyaline or nearly hyaline, only outwards somewhat yellowish colored basal layer which is composed of small cells and which is outwards strongly interspersed with the remnants of the host tissue. At the sides the basal layer often turns somewhat upward. The conidiophores are densely crowded, and occupy the whole surface of the basal layer.

It is clear that the fungus can only be placed among the *Melanconieae*. It is very nearly related to *Leptomelanconium Petr.*, differing, however, by the broad elliptical or oval, nearly globose and smooth conidia.

Heterosporium Elmeri Syd. nov. spec.

Maculae amphigenae, 0.5-1 cm diam., saepe nervulis limitatae, in epiphyllo albicantes, in hypophyllo albido-vel ochraceo-griseae; caespituli hypophylli, totam maculam occupantes, densissime gregarii, sed discreti, minuti, 40-80 micro diam., olivaceo-brunnei; conidiophora fasciculatim e basi stromatica cellulosa oriunda, simplicia, erecta, minora continua vel 1-septata, longiora 2-4-septata, plerumque leniter (praeterea in superiore parte) torulosa, olivaceo-brunneola, 15-38 micro longa, 4-5 micro crassa; conidia acrogena, cylindracea, utrinque obtusa, primo continua vel 1-septata et usque 20 micro longa, dein 2-5-septata et usque 50 micro longa, 5-7 micro crassa, plerumque non constricta, obscure olivaceo-brunnea, tota superficie densissime distincteque verrucosa.

On living or languishing leaves of *Ochrosia apoensis Elm.*, Irosin, April 1915, nos. 14968 and 14969.

Septobasidium minutulum Syd.

On leaves of a *Kickxia*, June 1916, no. 16269.

Septobasidium molliusculum Syd.

On leaves of a *Litsea*, August 1916, no. 16995.

Kordyana Pinangae Rac.

On leaves of *Pinanga insignis Becc.*, April 1916, no. 15684.

Uromyces Setariae-italicae (Diet.) Yoshino

On leaves of *Setaria flava (Nees)*, December 1915, no. 14497.

Puccinia Merrillii P. Henn.

On leaves of *Smilax reticulata Elm.*, May 1916, no. 16140.

Kuehneola Gossypii Arth.

On leaves of a *Gossypium*, July 1916, no. 16470.

Aecidium flavidum Berk. et Br.

On leaves of *Pavetta indica L.*, October 1915, no. 14729.

Meliola Alstoniae Koord.

On leaves of an *Alstonia*, September 1916, no. 17279.

Meliola Arundinis Pat.

On leaves of *Phragmites vulgaris* (*Lam.*), April 1915, no. 14568.

Compared with the type from Tonkin and found to be exactly the same. *Meliola dolabrata Syd.* from New Guinea is also the same species.

Meliola Bakeri Syd.

On leaves of *Tetrastigma sorsogonense Elm.*, April 1916. no. 15719.

Meliola Boerlagiodendri Yates

On leaves of *Boerlagiodendron mindanaense Merr.*, April 1916, no. 15694.

Meliola diplochaeta Syd.

On leaves of *Talauma Villariana Vid.*, September 1916, no. 17325.

Meliola Hyptidis Syd.

On leaves of *Hyptis suaveolens Poir.*, December 1915, no. 14891.

Meliola perpusilla Syd.—forma

On leaves of *Tylophora floribunda Elm.*, September 1916, no. 17393.

Meliola Butleri Syd.

On leaves of a *Citrus*, September 1916, no. 17238.

Meliola piperina Syd.

On leaves of a *Piper*, July 1916, no. 16700.

Meliola Sandorici Rehm

On leaves of *Sandoricum Koetjape (Burm.)*, July 1916, no. 16649.

(The specimens are sometimes parasitized by *Chaetosphaeria meliolicola Syd.)*.

Meliola Sidae Rehm

On leaves of *Sida acuta Burm.*, October 1915, no. 14777.

Meliola substenospora Hoehn. fa. Rottboelliae Rehm

On *Rottboellia exaltata Trin.*, December 1915, no. 14525 ex p.

Meliolina arborescens Syd.

On leaves of *Eugenia bulusanensis Elm.*, September 1916, no. 17319; also on leaves of *Eugenia Everettii C. B. Rob.*, August 1916, no. 17068.

Irene confragosa Syd.

On leaves of a *Cucurbitaceae*, August 1916, no. 16875.

Irene vilis Syd.

On leaves of *Callicarpa Blancoi Rolfe*, October 1915, no. 14357.

Parodiella Spegazzinii Theiss. et Syd.

On leaves of *Crotalaria sessiliflora L.*, June 1916, no. 16491.

Epiphyma Mucunae (Rac.) Syd.

On leaves of a doubtful *Mucuna*, July 1916, no. 16717.

Mycosphaerella Aristolochiae Syd.

On leaves of *Aristolochia tagala Cham.*, October 1915, no. 14415.

Mycosphaerella Pericampyli Syd.

On leaves of *Pericampylus incanus Miers.*, April 1915, no. 15086.

Anthostomella lucens Sacc.

On leaves of *Pandanus radicans Blco.*, December 1915, no. 14895.

Gibberella Saubinetii (Mont.) Sacc.

On leaves and culms of a *Panicum*, December 1915, no. 14567.

Catacauma makilingianum Syd.

On leaves of a *Ficus*, April 1915, no. 15073.

Catacauma Garciae Theiss. et Syd.

On leaves of a *Ficus,* August 1916, no. 16833. Although this collection is not on *Ficus Garciae Elm.,* but on a different fig, yet it agrees very well.

Phyllachora Canarii P. Henn.

On leaves of a *Canarium,* September 1916, no. 17281.

Phyllachora Rottboelliae Syd. et Butl.

On leaves of *Rottboellia exaltata Trin.,* December 1915, no. 14525.

Phyllachora Sorghi Hoehn.

On leaves of a *Sorghum,* November 1915, no. 15035.

Phyllachora yapensis (P. Henn.) Syd.

On leaves of a *Derris,* August 1916, no. 17014.

Sphaerodothis Arengae (Rac.) Shear

On leaves of *Caryota Rumphiana philippinensis Becc.,* April 1915, no. 14931.

Hysterostomella Tetracerae (Rud.) Hoehn.

On leaves of a *Tetracera,* April 1915, nos. 14576, 14577 and 14578.

Trichothyrium orbiculare Syd.

On leaves of *Ficus ulmifolia Lam.,* April 1916, no. 15815.

Micropeltella paetensis Syd.

On *Schefflera pentaphylla Elm.,* April 1915, no. 14723 ex p.

Amazonia Psychotriae (P. Henn.) Theiss.

On leaves of *Pavetta eucrantha Elm.,* July 1916, no. 16626.

Asterina Capparidis Syd. et Butl.

On leaves of *Capparis irosinensis Elm.*, May 1916, no. 15957.

Asterina Elmeri Syd.

On leaves of a *Champereia*, September 1916, no. 17278.

Asterina piperina Syd.

On leaves of a *Piper*, July 1916, no. 16702.

Asterina Pipturi Syd.

On leaves of *Pipturus arborescens* (*Lk.*), December 1915, no. 14756.

Asterina Sponiae Rac.

On a *Trema*, April 1916, no. 15138.

Prillieuxina Loranthi Syd.

On leaves of *Loranthus vulcanicus Elm.*, September 1916, no. 17329.

Lembosia Pothoidei Rehm

On leaves of *Pothoideum Lobbianum Schott*, December 1915, no. 14829.

Aldona stella nigra Rac.

On leaves of a *Pterocarpus*, August 1916, no. 16861.

Darluca filum (Biv.) Cast.

On leaves of *Eleocharis equisitina Presl*, October 1915, no. 14342.

Diedickea singularis Syd.

On leaves of *Polyosma sorsogonensis Elm.*, July 1916, no. 16679.

Actinothyrium maculosum Sacc.

On leaves of a palm, July 1916, no. 16634.

Gloeosporium Alchorneae Syd.

On leaves of *Alchornea rugosa Muell.*, December 1915, no. 14356.

Marsonia pavonina Syd.

On leaves of *Macaranga utilis Elm.*, July 1916, no. 16648.

Monotospora parasitica Syd.

Growing parasitically on the stromata of a *Phyllachoracea*, August 1916, no. 17081.

Helminthosporium ficinum Sacc.

On leaves of a *Ficus*, December 1915, no. 14900.

Helminthosporium Ravenelii Berk. et Curt.

In the spikelets of a *Sporobolus*, December 1915, no. 14519.

Ustilaginoidea ochracea P. Henn.

In the spikelets of a *Panicum*, October 1915, no. 14566.

LEAFLETS OF PHILIPPINE BOTANY
EDITED BY A. D. E. ELMER, A. M.

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REPORT OF MOUNT PINATUBO FERNS

Collected in May, 1927 by *A. D. E. Elmer*

by

CARL CHRISTENSEN
(*Copenhagen, Holland*)

———x———

Mr. A. D. E. Elmer asked me in a recent letter to prepare for the Leaflets a report on his ferns from Mount Pinatubo, of which he was so kind to send me in 1928 a complete set. The report as published here deals with 95 species, most of which are common Philippine ferns which need no commentaries, and the report appears, therefore, chiefly as a bare list of names.

Dealing with Philippine ferns it seems practical to use *Dr. Copeland's* nomenclature and conception of some genera (e.g. uniting *Alsophila* with *Cyathea* and *Diplazium* with *Athyrium*), though I do not always agree with him. References to literature is found in my Index Filicum. Having no detailed knowledge of the distribution of the ferns within the islands, I can not say which species eventually are new to Luzon or to the whole archipelago. Furthermore, I must emphasize another point that partly excuses the uncertain determination of some specimens. Having not seen all the types of *Dr. Copeland's* numerous new species (I have seen a great many), it is nearly impossible to name with accuracy several forms, mostly belonging to groups which have not been revised in recent years, and in such cases I found it best to take the species in a very wide sense.

I have still the dear duty of rendering my very best thanks to *Mr. Elmer* for the very pretty and interesting collection. His valuable field-notes are included under the respective species enumerated.

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GENERAL OBSERVATIONS BY *A. D. E. ELMER*

In 1927 *Major John O. Lackey* of Fort Stotsenburg invited me to join their summer camp in the Zambales mountains, located near Mt. Pinatubo. The province of Zambales is an elongated strip of of land, between Bataan province to the south and Pangasinan province to the north, its western coast is on the China Sea and its eastern border is a north and south extending mountain range called the Zambales mountains. This mountain chain begins with Mt. Mariveles in the south and breaks up into a number of shorter and lower ranges toward the northen end. Between Bataan and Zambales provinces there is a break or a low depression, through which there is now a good automobile road leading from the Manila Bay region to Olongapo on the China Sea side. This same road extends from Subic Bay northward along the coast to Alaminos, thence to Lingayen where it contacts with a net-work of roads leading to the south and to the north. Mt. Mariveles rises to 4500 feet in altitude, Mt. Pinatubo to 6250 feet; and further north between the northern half of Zambales province and Tarlac province the range registers its greatest height, between 7000 and 7500 feet in elevetion.

Ft. Stotsenburg is situated in Pampanga province valley, close to the foot-hills of the Zambales mountain range. It can be reached by automobile roads, rail-road and by airplanes. It has an abundant water supply from the mountains. The hilly region between the Fort and the mountains is extensive and grass covered—affording ample pasturage for the horses and mules of the cavalry. The scenic trail from Ft. Stotsenburg due westward into the mountains is 16 miles long, more or less, and was pretty rough travelling six years ago. The mountain Military Camp or "Campo" is located in a nice nearly flat open grass-covered area of land, strewn with rocks and boulders, just a short distance on the Zambales side of the mountain ridge, the dividing line between Pampanga and Zambales provinces. Its altitude is a trifle over 4000 feet. Mt. Pinatubo is nearby toward the north, and is 2000 feet higher than the ridge over which the trail leads. Good camp hikers can make the return trip in half of a day. The real summit of Pinatubo pinacle is a sharp point of smooth hard stone, possibly 500 to 750 feet over and above the range of the mountain mass; its upper portion is without vegetation, even in the rock crevices; and its greatest precipitous flank faces the west. It is hard for me to believe that the apex of this pinacle has ever been reached by any mountain climber.

Besides Mt. Pinatubo, there are many interesting places to visit. The Pinatubo river flows westwards into the China Sea. Follow this main water course or the beginning of the river up stream until you come to the very base of the Mt. Pinatubo precipice. Here the chasm becomes dangerous on account of the flying stones originating from land slides above us; take the same stream or river downward from the camp and you will come into a narrow gorge with water falls of different sizes. Along the main travelled trail leading out from the camp toward the coast is a densely forested gulch in which are a few "oak" species (*Quercus bennettii Miq.* and *Quercus pinatubensis Elm.*). The whole contour around the immediate vicinity of the camp is most interesting and alpine in nature—flats and rolling slopes, steep declivities, ridges, masses of wooded or jungle-covered mounds, fertile nooks and depression, sharp stream cuts with tangled and mixed vegetation.

The military mountain camp or Pinatubo camp, as it is sometimes called, consists of a square log-house with a large fire-place, and during the camping season—March to May—is used as the dining place for the campers who live mostly in tents. There was also a small wireless station. Pack trains and campers on saddle-horses came and went daily from and to Ft. Stotsenburg. The view out to the China Sea with its colorful sunsets was magnificently varied, a beauty very much enjoyed by all campers. Mt. Pinatubo and its precipice in sight at close range. The wonderful river canyon, the deep and abrupt creek cuts leading down to the river, and the pasture lands for the horses. The cold nights and the clear days were most exhilarating. Mt. Pinatubo with the other mountain masses are awe-inspiring, and challenge any mountainer. All in all, it is a fine alpine spot, very similar in places to the country about Baguio. But here there are no pine trees nor benguet lilies, yet I believe with a little encouragement they could be successfully introduced. From our camp on clear days we could hear the Ft. Stotsenburg air squadron zooming, and occasionally a machine or two was sent over the mountain range and back home again. On one clear day while I was on Pinatubo, a flyer came up, circled over the camp, then flew directly over Pinatubo and northwards. It gave me a thrilling sensation! From the higher points of the mountains

Ft. Stotsenburg is seen close by at our feet, and Mount Arayat, a valley land-mark, just a little beyond. The Pampanga river in the valley is seen as a silver line with large curves as it snakes itself into Manila Bay. They say by clear nights the glow of the electrical illumination of Manila can be seen.

During the first half of May the military camp for the summer vacationists was gradually withdrawn, and when *Lieut. Love* left, he gave me the key for the house. In it, I with my two helpers, were quite comfortably housed and we had ample room for our press work. Before passing on to another paragraph, I must relate two features of camp life which have very opposite effects. An unpleasant experience of this mountain camp was the annoyance caused us by millions of house flies. I don't see any reason why these pesty insects should be up there in such swarms and in a pure natural alpine place, even long after the camping season had close. During the day-time they were a special pest at the table. The diners had to shoo them off their food plates continually, and a person could not be sure whether or not a fly or two would not settle upon one's food while it was being taken from plate to mouth. The nasty things would even fly into the ears and eyes, and get tangled up with the eye lashes or try to get into one's nostrils. But by far the more pleasant feature was the cheery notes of numerous birds. They could always be heard in the bushes or jungles near-by and in the woods and forests further out. This song-praising of the birds was very noticeable on clear, cold, early mornings, even before actual day light. The "kalaw or mountain clock" would notify us of 4:30 a.m., occasionally a stray black crow with his "craw-craw" came up to see if there was anything to steal, the male of the wild chicken would make his crowing resound in the woods and which sounded very similar to home chickens, and the numerous other tunes of various members of the feathered family was a delight for me to hear.

An easy way for a plant collector is to follow the wooded margins from the meadows or open grass lands. Among this rich marginal vegetation I collected the only "ash" species (*Fraxinus griffithii Clarke*) known from the Philippines; besides a couple of shrubby trees of the "huckle-berry" genus (*Vaccinium benguetense Vid.* and *Vaccinium igorotorum H. F. Copel.*) Several species of wild figs were found, among which one or two were of the strangling kind (*Ficus chrysolepis Miq.* and *Ficus perfulva Elm.*). Along the river which flows by the camping place, half a mile below it, are many interesting plants. Scattered in the shrubby wooded sides were the purplish to pink "mountain-rose" (*Carionia elegans Naud.*); and in the flats *Saurauia elegans* (*Chys.*) was very common in the sand gravelly soil, ranging in size from 6 inches to 20 feet high trees, all bearing a profusion of flowers, even the small unbranched plants bore flowers. In the elfin woods of the summit region the pure white panicles of *Ligustrum glabrinerve Elm.* was seen everywhere as plume-like masses. Here also the *Medinilla whitfordii Merr.* was in its floristic splendor. In this chaparral formation, upon exposed ridges was noticed the small leafed and blood red short tubular flowered *Rhododendron marivelesense H. F. Copel.* Over all the moss laden limbs and reclining stems were dense clusters of the golden flowered "orchid", *Acoridium curranii Ames.* Another orchid, rare but far more showy and gorgeous in coloration was *Dendrobium victoriae-reginae Loher.* In its native place among the somber moss-covered trees and shrubs of wet sheltered ravines its flowers presents a most beautiful and delicate contrast. On the eastern very steep slope below Mt. Pinatubo the whole mountain flank was covered with a pure stand of the large circular leafed, rank and herbaceous *Halorrhagis micrantha* (*Thbg.*). Upon raised benches of wide river flats and over which the winds have a free sweep, masses of different kinds of orchids were found, also clump and sphagnum mosses, and a various lot of scale-mosses. In the drier stony flats of the river a brittle ashy lichene densely covered the surface everywhere (see *Elmer* No. 21979). *Nepenthes alata Blco.*, a pitcher plant, was also growing in this same general region in great masses. In size this species would vary from a few inches to rambling and finally shrub and tree climbing. The old stems are pliable and about as thick as a man's finger. Only the older plants bear flowers and fruits. The little plants bore thimble-sized pitchers, while those on the mature plants were nearly a foot long. After a rain these pitchers are full of water, and when collecting in shrubby jungles where they are, the pitchers get tilted and spill their contents upon the collector. No matter how carefully a person tries to walk about in the early mornings among them with dry stockings on one's feet, the younger pitchers lying about on the ground would get turned over and manage here and there to pour their cold water contents upon and over the tops of one's shoes. In the woods of damp fertile soil one walks over *Selaginellas* shoe or knee deep. When one penetrates further in, into sheltered ravines and cuts where the sun seldom shines, and that only for a short duration, or in other humid flats a collector encounters a mass of varied vegetation—a tree canopy with vines and lianas, high and low shrubs, and different kinds of herbs. In these clammy pockets where one wonders why the ground vegetation never mildews, the observer usually finds plenty of ferns and their allies.

During the month of May we had fine weather, and in the valley it was considered the hot dry season of the year, yet in this short time I succeeded in collecting some over 400 numbers of different plants including the *Cryptogams* and *Pteridophytes.* About one fourth of this number are ferns and a few near allies—an unusual high percentage of these beautiful denizens. And if I had started earlier looking into these dark recesses and with a little more alertness I could have picked up considerably more, for it seemed that for the last week or two of my collecting I was filling my presses with them daily. No doubt I trampled over certain different closely related species and varieties which I should have collected—not having a technical discernment of this group of plants and relying too much on my memory as to what I already had collected. Then again, I was constantly on my guard against collecting duplicates, and as *Dr. Christensen's* report indicates I have collected few species more than once. It was a most bewildering task in the field for me to detect and discriminate between different forms of such similar groups of plants growing together under similar ecological conditions. Species with pronounced characters or of small genera could easily be remembered. Examples of this are the mossy masses of the hair-like *Monogramma paradoxa* (*Fée*), *Christiopteris sagitta* (*Christ*), and the *Lecanopteris carnosa Blm.* The last one mentioned surely makes an impression upon the collector, for its interlaced rhizomes are honey-combed and infested with a most pernicious species of small ants which can certainly bite! Species of such genera as *Asplenium, Dryopteris* and even *Polypodium* are hard to distinguish in the field critically. Of the last mentioned genus I gathered fifteen distinct species, two or three of which *Dr. Christensen* found to be new to botanical science. This is an unusually large number of species in one genus from such a small area.

It is most interesting to observe the wide range of habitat the different members of the fern family assume, and the different shapes they develop into, in order to adapt themselves to certain conditions. We have the tree-ferns, fine moss-like ferns, climbing ferns, epiphytic or cleaving ferns, rambling or prostrate ferns, hanging ferns, the barrel-shaped ferns with its 2 to 3 feet thick but short trunk bearing from the top a rosette of spreading fronds, some of which measure 25 feet in length and fully half as wide,—but the bulk of fern species are terrestrial, and with fronds pinnately dissected. The arrangement of their sori are quite fantastic, and the spores themselves vary from blackisk brown to reddish brown, greenish to yellow. But a fern is a fern and can always be recognized as such.

With the change of season and the advent of rains a great deal of fog rolls in from the China Sea and sweeps along the river gorge with a blast directly against the highest mountains and up over them into the drier valley air. It was a delight to watch the fanciful movements of these fog clouds,—sometimes sneaking up slowly from the Zambales valley to your level, sometimes settling only along the river canyon and along the small creek depressions in the higher altitudes, sometimes hurling itself against the base of Mt. Pinatubo and following its precipice up to its tip and disappearing in the air above, sometimes peacefully lingering about, over the ranges or seemingly anchored at the very apex of Mt. Pinatubo only, and then again densely covering everything. Under such conditions the dry parched grass lands soon become verdure green and all species of grasses and sedges begin to flourish. At this time of the season and in this turf land, colonies of a dainty "fly or small insect catcher" (*Drosera peltata Sm.*) was noticed with its white flowers, and here and there minute insects were observed to be in trouble, as they were stuck in the viscid gland hairs from the upper side of its specialized leaves. Near by my camp was a rambling wild "rasp-berry" coming into fruit (*Rubus rosaefolia Sm.*) and from which I gathered a number of cupfuls of its red berries for my table with sugar and cream! And so, with the change of the monsoon, many plants became active, and in a surprisingly short time the annuals and biennials were fully grown, the perennials bore flowers, and the woody plants burst into buds, developing into flowers or new leaves.

Toward the end of May, and before I was ready to leave the field, a storm or typhoon overtook me, and for a week or ten days it was raging day and night with heavy down-pouring of rain. I, with my native boy or hired man from Manila managed to get wood enough into our house to keep the fire in the fire-place burning continually for health reasons and for the good of our specimens. The roof made of petroleum can tins was rattling, and for fear we placed some poles over it, so the wind, if stronger, could not tear them off. During part of this siege it was blowing terrifically, we had to bolt our door from the inside with a log or two. Fortunately the log-house had no windows. We could hear the limbs and trees break and crash in the forest, but we were safe from that danger. We could also hear thundering land-slides day and night. The creeks and rivers began to roar, and during one night of this awful time we had an earthquake that slung my cot around, and in a moment we were outside the house! In the meantime our rations were getting low, the creeks and rivers too high or swift for safe crossing. But we did follow a ridge down until we came to a small Negrito clearing or field and dug up some camotes or native sweet potatoes. For several days we dieted on these fresh tubers and they gave us the physic. Suddenly on one day the winds abated, a break in the clouds, and shortly after a crystal clear blue sky with a dry warm sun. The typhoon was over, and we were glad for the relief!

We began at once clearing the trail toward Ft. Stotsenburg, while the Military in the valley were working on the trail toward us, for they knew I was up there marooned. After nearly a week's hard labor from both ends of the trail, the Military pack train of twenty-five animals came up over the rough washed-out trail with some provisions, and after a day or two, we were ready with our luggage and collection for Manila by way of Ft. Stotsenburg. The green "oats" in the old horses' compound was just beginning to head, and it was funny to see these horses and mules mow it down. We left the "Campo" early one clear cold morning, but after an hour's slow travelling, it began to rain steadily and we arrived in the Pampanga valley drenched.

The natives inhabiting the Zambales mountains are "Negritos or Aetas". Those in the hills back of Ft. Stotsenburg are commonly called "Balugas". These little people are not as harmless as one would take them to be. In the earlier years they often went out on raids against a different clan among themselves, cause depredations to the Tagalogs in the valleys, and occasionally committed heinous crimes. It is this treacherous undependability among themselves which has discouraged or deterred scientific exploration work, and as a consequence we know very little of the Zambales mountain flora. The same can be said of other natural sciences and of Geology, particularly as to oils and minerals. Only recently a rich bed of chromium was discovered in Zambales province, and which was placed under government reservation. The Negrito complexion is a brownish black, their stature small, with curly unkempt hair, is half starved and fierce looking, dirty in body and ragged in his scanty clothes. I used to think the Igorotes and the tribes in the mountains of northern Luzon about as dirty a tribe of peoples as we have in the Philippines, but even they would take a bath once a year. These Zambales mountain dwellers live in small huts or shacks, the frame-work made of bamboo (grass stems) or wood poles, and thatched either with grass or palm leaves. Usually they congregate in small colonies or settlements, but frequently only one or two families are found in a small clearing by themselves. In patches of fertile soil they plant "camotes" or a stingy sweet potato, a little corn, "gabi or taro", a few tomatoes, the fruit of which is no larger than a pea or cherry, a poor grade of papaya or papaw, etc. The young leaves of camotes and those of gabi are cooked as greens. Occasionally they plant little fields of upland rice. Besides these introduced plants, they obtain some crude food products from the woods and forests. They do all their work by hand with an iron implement called "bolo" or "sundang". They seldom leave their mountain abodes for travelling to the valleys, except on trading trips to the Christian Filipinos. In their mountains they gather rattans used in wicker works, grass panicles which are made into native dust brooms, and the porous pulp wood of a liana which is extensively used by the poorer classes of the valley folks for hair cleansing. All these, and some others, they exchange with the valley shop keepers for such articles as they like. In their travels from one side of the mountain, over the ridge trail to the other side, they usually stopped over night at my house—sometimes 25 of them were sleeping on the ground floor. Some of them knew a little Tagalog and could converse with my Christian Filipino servant. One day as I was watching a ship pass on the China Sea an intelligent Negrito asked me if one could walk on the sea or ocean? They are all owners of nearly starved dogs, and they enjoy hunting wild pigs, deer, birds and the like with their dogs and bows and arrows. These simple folks arrive without any greeting, make themselves at home, and depart without a word or gesture.

In conclusion I wish to extend my thanks to the authorities of Fort Stotsenburg for having given me the privilege of visiting their mountain camp, for their transportation, tent and house facilities, and most of all for their hard efforts in bringing me out so promptly after the storm.

LIST OF THE SPECIES

CYATHEACEAE

Cyathea contaminans (Wall.) Copel. *Alsophila glauca (Blm.) J. Sm.*

No. 22099 field-note:—A 6 inches thick tree-fern, along creek beds and along streams in woods; stem with scars; fronds widely spreading, 10 feet long or longer; thick petioles or stipes brown and spiny, its basal portion covered with yellowish white scales; pinnae subglaucous green beneath, heavy, the final segments subpendent.

Cyathea (Alsophila) sp. aff. **C. latebrosa (Wall.) Copel.**

Specimen too incomplete for a sure identification.

No. 22067 field-note:—A 5 inches thick tree-fern, along deep densely wooded ravines or creek cuts; fronds horizontal, 2 yards long, stipe at the base covered with dark brown scales; pinnae subglaucous beneath, extending in reduced forms clear to the base.

Cyathea loheri Christ

No. 22185 field-note:—A 5 inches thick tree-fern inhabiting the crags of the peak region; stem earthy brown, crooked; fronds many, horizontally spreading; the stipes toward the base a few inches thick, it with the rachis densely covered with yellowish brown scales; segments heavy, strongly recurved especially the pinnae which are paler on the lower side. This stocky tree-fern bears an abundance of yellowish brown spores—the dust of the ferns.

DICKSONIACEAE

Cibotium cumingii Kze.

This seems to me quite distinct from *C. barometz (L.) J. Sm.* by its hirsute secondary and tertiary rachises, and by constantly unijugate sori at the base of each segment.

No. 22023 field-note:—Stump fern, on densely shaded bluffs near deep cuts; root-stock hard but rather thick; fronds few, 15 feet long, more or less, much recurved, the basal one third stipitate; stipes at the base covered with soft golden yellow hairs; the hard rachis yellowish green above, brown beneath; segments also recurved, glaucous green beneath.

GLEICHENIACEAE

Gleichenia linearis (Burm.) Clarke

No. 22294 field-note:—Dense masses in rather dry soil of stony cuts of open grass lands; rhizomes forming a matrix and covered with dull brown woolly hairs; stipes erect, paler brown than the rhizome, smooth; frond tips recurved, the main segments ascending, rigid, pale or yellowish green but often subglaucous beneath.

HYMENOPHYLLACEAE

Hymenophyllum eximium Kze.

No. 22234 field-note:—Running upon moss covered limbs and inclining tree trunks of the summit region at 6000 feet elevation; stipes ascending, brownish black; the recurved fronds very dark or dull green on both sides. Quite common at this altitude.

Hymenophyllum paniculiflorum Presl

No. 22315 field-note:—Masses along the lower sides of inclining tree trunks; stems and fronds descending, the rhizomes thread-like, the thin pinnae dull green.

Trichomanes apiifolium Presl

No. 22136 field-note:—Clumps upon sides of a well shaded yet airy flanks of a bluff at about 6000 feet elevation; rhizome or rather root-stock hard and rigid, several inches long by an inch thick; fronds descending toward their tips, soft but dry in texture; the stipes usually ascending, stiff and more or less brittle.

Trichomanes pallidum Blm.

No. 22108 field-note:—With other mosses and scale-mosses forming patches in the lower or sheltered trees, logs or cliffs of very wet or humid places; the messed rhizomes filiform; fronds descending or subpendent, very thin or soft, ashy gray on both sides.

MARATTIACEAE

Marattia ternatea de Vri.

No. 22073 field-note:—Large succulent terrestrial clump on a steep very wet incline; trunk short but thick; fronds decompound, several, 10 feet long, more or less; the yellowish green ascending stipes shorter than the frond portion and covered with yellowish brown scales especially toward the base where it is provided with a pair of thick stipular organs; pinnae recurved, much darker green above.

OSMUNDACEAE

Osmunda banksiifolia (Presl) Kuhn

No. 22344 field-note:—A terrestrial stump fern in wet earth of a nearly precipitous bank covered with jungle growth; fronds rigid, dry in texture, many, arranged in a rosette, 1.5 yards long, only sterile, the fertile pinnae are usually scattered in the middle portion of the frond. Only one plant was found in our region.

POLYPODIACEAE

Adiantum diaphanum Blm.

No. 22284 field-note:—Tuftlets of various sizes, upon seepage ledges along a narrow creek cut; fronds spreading in a rosette fashion, the longer ones so much recurved as to contact with the ground where a new plant develops at its tip; the stipe and rachis shining black, semgents flat, thin, pale green on both sides.

Aglaomorpha brooksii Copel., Philip. Journ. Sci. 6 C: 141, pl. 25, 1911.

New to the Philippines, known from Borneo. The specimen is larger than those described by *Copeland*, the sterile segments about 30 cm long by 6 cm wide, the fertile pinnae of the same length and 2 cm wide; the sori forming dense patches of two rows of confluent single sori which are oblong and parallel to the costa; the patches 1 cm long, 6-7 mm wide, thick.

No. 22077 field-note:—Epiphytic clumps, nearly a yard across the root base, in a very humid gulch; fronds ascending, many, 1.5 yards long or longer, shining and slippery even in the dry state; basal segments gradually reduced, toward the apex confluent; spore blocks upon the terminal segments only.

Asplenium adiantoides (L.) C. Chr. *(A. falcatum Lam.)*

No. 22242 field-note:—Small tufts in moist moss covered jungles of the peak region, altitude 6000 feet; rhizome quite rigid, curved and crooked, occasionally branched, densely covered with chocolate brown scales; stems of fronds ascending, up to 2 feet high, shining dark brown; the segments very much recurved.

Asplenium filipes Copel.

One of the many reduced forms of *A. unilaterale Lam.*

No. 22138 field-note:—Dense colonies in a wet place near the bottom of a wooded ledge; rhizomes thin, flexible, crooked and branches; stipes ascending, fine, brownish to black; fronds much recurved, paler beneath.

Asplenium laserpitiifolium Lam.

Nos. 22025, 22217 field-note for the former:—Terrestrial tufts or clumps in shallow humus covered wet earth near densely wooded bluffs; rhizome short, crooked, not rigid nor hard; stipes erect or ascending, lucid, brownish black; fronds pale green especially on the under surface, the main portion recurved, tips of its segments slenderly pointed.

Asplenium nidus L.

No. 22035 field-note:—"Bird's-nest" fern in the limb crutches of small trees in a wooded flat of a stream bed; fronds ascending, sublucid, the old ones recurved and persistent in the dead state, the margins irregularly wavy, narrowed and inwardly curved toward the base, with a matrix of spongy rootlets in their axils, the midrib nearly black beneath. This species or a form of it is constantly brought in from the provinces to the city of Manila and valley towns for ornamental purposes. In British North Borneo I collected a similar species whose blades measured 10 to 15 inches wide and 5 to 7 feet long.

Asplenium normale Don

No. 22249 field-note:—Tuftlets in dark or sheltered places on ground of the summit region at 5000 feet elevation; stipes ascending, shining dark brown or blackish, they as well as the rachis slender, similar to those of *Adiantum* species; fronds scattering and much recurved; segments thin, dark green but especially so above.

Asplenium pellucidum Lam.

No. 22049 field-note:—Dense clumps upon humus and vine covered stony ground of a deeply shaded creek bed; the rhizome short, rigid, suberect; the stipes and rachis earth colored; fronds erect, recurved toward the apex, darker green above.

Asplenium spathulinum (J. Sm.) C. Chr., Gardens Bull. Str. Settl. 4: 400, 1929.

No. 22098 field-note:—Several stemmed clusters, in wet humus covered soil of jungles; stems ascending, quite rigid; fronds heavy, much recurved, tips often touching the ground where new plantlets are formed, paler green beneath. A beautiful fern.

Asplenium truncatilobum (Presl) Feé, Gen. Fil. 191: *Christ*, Philip. Journ. Sci. 2 C: 164. (*Tarachia truncatiloba Presl*, Epim. 77).

Quite distinct from *A. caudatum Forst.*, especially by the densely scaly rachis; the scales ovate, clathrate, with long cilies and long hair-pointed; the under side of the deeply and broadly lobed short pinnae are also rather scaly. Here belongs *Copeland*, Pteridophyta Philip. exsicc. No. 98 distributed as *A. caudatum Forst.*

No. 22026 field-note:—Small terrestrial clumps in wet and shallow humus covered soil near bluffs of a deeply shaded place; stipes soft or nearly so, blackish brown, covered with a similarly colored pubescens; fronds reclining over the ground surface, often somewhat curved, the upper surface shining and much darker green of a metallic tint.

Asplenium unilaterale Lam.

Two forms; No. 22125 the large one by *Yabe* called *A. rahaoense*. Nos. 22088, 22125 field-note for the latter:—Few stemmed clumps or tuftlets in wet talus beds of humid woods; rhizome dull green, herbaceous, crooked and horizontal, rebranched; the erect stipes soft in texture, shining, brown to black in color, the rachis similar; fronds recurved especially toward their tips, paler beneath; the thin flat lamina somewhat paler beneath and serrate along the upper edge.

Athyrium (Diplazium) dolichosorum Copel.

With a very large primary pinna, 80 cm long by 25 cm wide, of a species in the group of *Diplazium maximum C. Chr.*, Index. Best but not quite agreeing with *Copeland's* species. It is considerably larger; the secondary pinnae up to 15 cm long by 3 cm wide at base, incised one half. The lobes falcate, 5 mm broad at the base. The small portion of the rachis is furnished with one or two small spines. Perhaps new.

No. 22164 field-note:—Terrestrial ferns in a damp or wet ravine; stipes arising from a stump or root-stock nearly a foot thick and a foot and a half in length; frond stems or stipes pale yellowish green, several, more or less shining, ascending, 1 to 2 yards long, somewhat spiny toward the base; fronds as long, much recurved, paler beneath.

Athyrium drepanopterum (Kze.) A. Br.

No. 22347 field-note:—Terrestrial tussocks in turf bordering large boulders of the grass lands; root-stock a few inches long, an inch thick or across; stipes not hard nor brittle, pale yellowish green to brown; fronds recurved; the yellow sori turning nearly black when old.

Athyrium (Diplazium) grammitoides (Presl) Milde

No. 22103 field-note:—Soft little tufts upon moss covered stones and boulders along a stream bed of a deeply shaded cut; fronds descending or reclining over the surface of the stones, pale green especially upon the under side.

Athyrium mollifrons C. Chr. sp. nov.

Rhizomate stipiteque? Lamina subtripinnata, tenuiter herbacea, rachi (fragmento breve solum viso) griseo-straminea, paleis minutis linearibus laete brunneis et hinc inde nonnullis paulo majoribus marginibus atris, acute dentatis cinctis sparse onusta. Pinna primaria visa 50 cm longa, 20 cm lata, petiolo 3 cm longo, costa subflexuosa, ut rachi sparse paleacea. Pinnulis alternis, plerisque breve pedicellatis, 4 cm inter se remotis, recte patentibus, basi truncatis, breve acuminatis, ad 12 cm longis, 4 cm latis, ad basin ad costulam pinnatis sursum fere ad eam pinnatifidis, costulis inferne ut costis paleaceis. Pinnulis vel segmentis tertiariis 10-12-jugis, liberis 1-2-jugis ad costulam late adnatis, confluentibus contiguis vel interdum subimbricatis, majoribus 2.5 cm longis, 7-8 mm latis, basali acroscopica abbreviata, apice breve acutis, serrulato-dentatis, dentibus obliquis, deltoideis, basi 2 mm latis. Venis 7-8-jugis, medio furcatis. Soris costularibus, 1-2 mm longis, indusiis vix conspicuis, mox evandis, saepe perfecte carentibus.

In spite of having only a primary pinna of this fern I venture to describe it as new. Because of its short costular sori and its whole appearance it must be placed in the group with *A. silvaticum* (*Blm.*) *Milde*, (*Diplazium brevisorum J. Sm.*). But from which species it differs by much thinner texture, much broader segments and almost exindusiate sori, only traces of indusia, like small membranous scales, are found here and there; the sporangia of the lower sori are borne on both sides of the veins, the sori thus diplazioid. The black-margined scales are similar to those found in *Diplazium crinitum* (*Bak.*) *C. Chr.* and some other species, but much smaller. Unfortunately *Copeland* did not describe in detail the structure of the scales of the many species of this genus described by him, and it is possible, therefore, that our new species will appear to be identical with one of them.

Elmer No. 22375 field-note:—Stump fern or tussock in very wet ground mixed with stones along the creek of a deep very humid cut; root-stock 6 inches thick, twice as long; stipe ascending, a yard long, 1 inch thick at the base where it is blackish brown and beset with similarly colored scales, dull green toward the frond; fronds succulent, widely spreading and tips recurved, as long as the stipes which are deeply channelled along the upper side, paler beneath.

Athyrium (Diplazium) williamsii Copel.

No. 22128 field-note:—Clumps in wet ground of humid woods near the bottom of a cliff; rhizome or rather root-stock suberect, 1 inch thick, several inches long or high, very hard or rigid; fronds ascending but finally recurved, much lighter green beneath.

Antrophyum callifolium Blm. var.

A critical form, perhaps a distinct species, but I dare not give it a new name before the Malayan species of this difficult genus are critically revised. It differs from the common form of *A. callifolium Blm.* by its pure brown (not blackish) and sub-entire or minutely dentate (not sharply dentate) basal scales and by the narrower, denser and deeply immersed sori. By the latter character it agrees closely with *A. strictum Mett.* but the very short paraphyses are filiform.

No. 22038 field-note:—Hanging or pendent clumps or bunches from tree trunks in wet flats of woods near a stream bed; rhizome short, not rigid, yellow inside; fronds or rather blades much lighter beneath, above often with a metallic hue; stipes short, often twisted; rootlets forming a spongy mass.

Blechnum egregium Copel.

A sterile frond, fairly well corresponding to *Copeland's* description. It is the only species of the group of *B. attenuatum Mett.* known from Asia. This group is represented in the southern temperate region (Africa, America, Polynesia) by several closely related species, some of which extend into the tropics.

No. 22135 field-note:—Coarse tufts upon dry but deeply or densely wooded cliffs; root-stock a few inches thick, nearly a foot long or high, descending but its apical frond bearing portion ascendingly curved; fronds paler beneath. yet dull all over, in a rosette, rather dry, more or less spreading, the young erect ones pink colored, the older ones with a bluish green or metallic luster.

Campium diversifolium (Blm.) Copel., Philip. Journ. Sci. 37: 362.

No. 22303 field-note:—Small succulent tufts in wet stone-gravelly ground upon a steep wooded slope; rhizomes dull, branched and crooked, green but covered with earth colored hairs; stipes watery green; the rather thin dull green sterile ones also covered with earth colored hairs; the rather thin dull green sterile blades simple or forked, varying in size; the heavy fertile fronds more erect.

Christiopteris sagitta (Christ) Copel.

No. 22116 field-note:—Epiphytic and usually associated with other air plants, often forming masses or clumps about the base of bird's-nest ferns, in dark humid densely forested flats; rhizome branched, crooked, quite rigid; stipes also rigid; the smooth stiff blades of various sizes and shapes, with recurved tips, lucid on both sides, quite slippery.

Cyclophorus adnascens (Sw.) Desv.

No. 22015 field-note:—Climbing and forming dense masses along limbs of trees in a dark wooded ravine; rhizomes flexible and rebranched; the fronds are thick and very rigid, descending, the midvein usually brown beneath. Apparently this same species in a dwarfed form inhabits also the low lands in airy places along water courses, occasionally it is observed in Manila.

Cyclophorus lanuginosus (Geis.) C. Chr.

Nos. 22255, 22325 field-note for the former:—Ramifying along the lower side of boulders or upon limbs of trees in thickets and in woods; rhizomes forming mats, long, repeatedly branched, rigid, breaking with a snap, tightly attached to their support; stipes erect; the brownish blades thick and rigid, also erect, dull green or grayish green, covered with a matrix of woolly gray hairs beneath, margins strongly involute.

Cyclophorus sphaerostichus (Mett.) C. Chr.

This Philippine species is often called *C. lingua* by *Copeland,* Pteridophyta Philip. exsicc. No. 90.

No. 21962 field-note:—Forming dense masses upon moss covered boulders in shrubberies; rhizomes rigid, branched and ramifying or spreading; the stiff stipes erect; the frond blades well ascending, also rigid, chalky white on the nether side, grayish green on the upper surface; the sporophylls erect, usually narrower.

Davallia embolostegia Copel.

No. 22197 field-note:—Scattering over wet boulders of damp shaded ravines; rhizome rigid, short, branched, greenish but densely covered with golden yellow scales; stipes erect, smooth, green, 2 feet long; fronds as long, broadly spreading, recurved toward the ends, soft in texture.

Davallia solida (Forst.) J. Sm.

No. 21991 field-note:—Matting over stones or boulders in shrubberies along the river bed; rhizome rigid, occasionally branched, tightly attached; stipe green, quite rigid, erect or ascending; fronds erect or nearly so, the segmented tips recurved, tough, very little paler beneath.

Davallodes hirsutum (J. Sm.) Copel.

No. 22180 field-note:—Forming clusters on the nether side of tree trunks in humid depressions; rhizome crooked, short rebranched, not rigid, one half inch thick, greenish except the trichomes; fronds descending, soft, pale green especially beneath.

Dennstaedtia smithii (Hook.) Moore

No. 21937 field-note:—Few stemmed terrestrial clusters in very humid and shady depression; root-stock a few inches thick by nearly a foot long; stipes a yard or two long, green, soft and pubescent; the frond portion nearly as long and widely spreading.

Dipteris conjugata Reinw.

No. 22201 field-note:—Scattered but more or less gregarious in very wet and mossy thickets of the high alpine region; rhizome very rigid, branched; stipes strictly erect, one yard long, blackish brown, also very rigid, smooth, sublucid; the frond halves more or less horizontally spreading, smooth and charactaceous, shining above, subglaucous green beneath.

Dryopteris (Cyclophorus) adenophora C. Chr.

No. 22044 field-note:—Ground ferns in several stemmed clusters upon wet wooded ledges near a stream bed; root-stock 6 inches long, relatively thick; stems erect, the stipes yellowish green; frond portion longer than its stems, much recurved; the thin segments lighter green beneath.

Dryopteris (Ctenitis) dissecta (Forst.) Kze.

No. 22304 field-note:—Densely tufted ground plants or ferns upon steep wooded hill sides; root-stock 2 inches thick, up to a foot in length; stipes ascending, brownish especially along the lower side; fronds much paler beneath, also ascending more or less, the segmented tips recurved.

Dryopteris (Cyclophorus) ferox (Blm.) Kze.

No. 22259 field-note:—A coarse and rank stump fern in well shaded seepage ledges at a creek junction with the river; stump or root-stock short and thick; stipes ascending, a yard long, pale green above, brown below, densely beset with dull brown bristles which are especially long and dense toward the base; frond portion longer than the stipe, dry, pale green, gradually recurved; the segments similarly recurved.

Dryopteris (Cyclophorus) aff. D. hispidula (Dcne.) Kze.

In size, cutting and texture like my specimen of *D. hispidula*, but all hairs very short and the sori apparently exindusiate. May it be *Nephrodium angustifolium Presl*, Epim. 48 (*Cuming* 268) or an exindusiate form of it?

No. 22283 field-note:—A stump ground fern forming clumps in wet sand-gravelly soil among larger stones or boulders along the river; root-stock 2 inches thick, suberect, a half foot long; stems or stipes, many, yellowish green or brown, ascending; the frond portion recurved, the segments pale or yellowish green beneath. A nice appearing fern with its numerous fronds gracefully recurved and arranged in a rosette-like fashion.

Dryopteris (Lastrea) leucolepis (Presl) Max., Proc. Biol. Soc. Washington 36: 172, 1923. (*Lastrea leucolepis Presl*, Epim. 39).

Formerly united with *D. setigera* but in reality a very distinct species, especially marked by the much firmer texture and all ribs being furnished with pale brown ciliate scales.

No. 22224 field-note:—Small terrestrial clumps in wet sandy soil of banks of ravines; root-stock very short and thick; stalks or stipes ascending, yellowish to brown, 1 to 2 feet long, the basal part covered with pale whitish scales; the frond portion longer and much recurved, its segments likewise recurved.

Dryopteris (Lastrea) ligulata (J. Sm.) Kze.

No. 22280 field-note:—Few stemmed terrestrial clumps or clusters in wet ground of a shady land slide of the river gorge; root-stock short, hard, black; stipes ascending, shining, pale green except the black base, up to a yard in length; fronds as long, ascending and recurved toward the apex, dry; dull or dark green above; the rachis yellowish white or nearly so.

Dryopteris (Cyclophorus) loheriana (Christ) C. Chr.

No. 22150 field-note:—Rank clumps in very wet ground in wooded depressions; stump or root-stock a few inches thick by a half a foot long or longer; stipe up to a yard long, dull green to brown at the base; frond portion as long as their stems, strongly recurved; the segments rather dry, flat, much paler on the nether side.

Dryopteris (Cyclophorus) luzonica Christ

Nos. 22281, 22008 field-note for the latter:—Ground fern with several stems in very wet soil or upon creek ledges in dense woods; roots from the short root-stock black and numerous; stump 1.5 inch thick, 6 inches long; stipes 1 to 3 feet long, green except the black base; fronds as long or longer, much recurved, light green yet paler beneath, its rachis straw brown; the pinnae darker green on the upper side.

Dryopteris (Cyclophorus) porphyricola Copel., Philip. Journ. Sci. 7 C: 60 **vel sp. proxime affinis.**

This fragmentary specimen is rather indeterminable, lacking stipe and base of lamina, but it agrees closely with the type from Sarawak in shape and cutting of the pinnae and especially in the densely appressedly strigose upper and glandular under surface; yet it is more robust, the rachis 6-7 mm thick and the pinnae longer, 20 cm long by 2 cm wide.

No. 22075 field-note:—Coarse terrestrial tufts or tussocks in wet gravelly ground of cool, densely wooded gulches; trunk or root-stock 6 by 18 inches; fronds numerous, erect but recurved towards their ends, 1.5 yards long or longer, the basal on third stipitate, but with green pinnate bracts all along the stems; segments lighter green beneath, much recurved or subpendent at the tips.

Dryopteris (Ctenitis) rhodolepis (Clarke) C. Chr., Index part.

Mr. R. C. Ching referred these specimens to *D. lepigera* (*Bak.*) *Kze.*, a species from the Bonin Island. But they seem to me more agreeing with *D. rhodolepis,* though more ample than the Himalayan form.

Nos. 21927, 22162 field-note for the former:—Terrestrial stump ferns in damp earth of cool moist woods; root-stock 2 by 6 inches in size; stipes or stems few, erect or ascending from near the ground; the frond nearly as long, soft in texture, much recurved or reclining. A very pretty fern denizen.

Dryopteris (Lastrea) setigera (Blm.) Kze.

No. 22279 field-note:—Terrestrial, upon ledges of the river cut; root-stock thick, rigid, short, covered with nearly black scale-like bristles; stipes erect, 2 feet long, smooth except the scaly base, pale yellowish green; frond much recurved, yellowish green especially so on its lower side.

Dryopteris (Abacopteris) urophylla (Wall.) C. Chr. var.

This species is usually confined to a composite group, and the present form is no doubt specifically distinct from its typical form, but the specimen is too incomplete for description. It is especially marked by its softly villous under side, not pustulous as the variety of *D. urophylla pustulosa Christ* which scarcely belongs to this species.

No. 22155 field-note:—Quite a rank terrestrial clump of damp ravines; main stem or root-stock thick, short and crooked or curved; stipes few, erect or somewhat ascending, a yard long, green, except the brownish base; frond portion as long, recurved toward their tips, paler beneath, quite thin and dry in texture; rachis yellowish brown.

Egenolfia rhizophylla (Kaulf.) Fée, Gen. Fil. 48. *(Gymnogramma rhizophylla Kaulf.*, Enum. 78. *Lecaussadea rhizophylla Gaud.*, Voy. Bonite, pl. 120. *Polybotrya serrulata J. Sm.*, *P. neglecta Fée*, Acrost. pl. 39, f. 2, and *P. appendiculata C. Chr.*, Index part).

The all comprising *Polybotrya appendiculata* of my Index must be split into several more or less distinct species of which the present is a common fern in the Philippines. The whole group of species must be further segregated from the genus *Polybotrya*, being totally different from its type species, the American *P. osmundacea Willd.*

No. 22333 field-note:—Small tufts or tuftlets in loose talus earth of a deeply shady nook near a cliff; this species forms more or less colonies; fruiting frond not found, the dark colored sterile fronds gracefully recurved, the tips of many touch the ground where a new plant is formed; the pinnules very dull green or of a semi-metallic hue.

Elaphoglossum petiolatum (Sw.) Urban.

This species is here taken in the widest sense; it is hardly probable that this Asiatic form is conspecific with the West Indian type.

No. 22210 field-note:—Small bunches on tufts upon wet humus covered stones in deeply shaded thickets; rhizome bendable, short rebranched; stipes or petioles of the blades ascending, dull green; fronds recurved, sublucid and deeper green above; the young sporophyll erect, ashy green on the upper side, the nether surface completely covered with nearly coal-black spores.

Humata gaimardiana (Gaud.) J. Sm.

No. 22261 field-note:—Ramifying and cleaving to smooth rock surfaces among thickets along the river bottom; rhizome glaucous green, covered with brown scales; fronds erect, rigid, yellowish green beneath. Very rare in our locality.

Humata ophioglossa Cav. Descr. pl. 273. *Fée*, Gen. Fil. pl. 26 A.

This species is by most writers united with *H. heterophylla (J. Sm.) Desv.* (*H. pinnatifida Cav.*), but after having compared the types of *Cavanille's* two species with a large number of specimens, I am sure that both must be maintained. From my unpublished notes on the species described by *Cavanilles*, now preserved in the Botanical Garden at Madrid, I give here the discriminating characters of the two species.

Humata ophioglossa Cav. Rhizome scales squarrose, entire, hair pointed. Sterile leaf on stipe 1-1.5 cm long, the blade ovate-oblong, acute or obtuse, 3-4.5 cm long, 2 cm wide, the base rounded or subcordate, the margins shallowly serrulate with a low notch between the veins. Fertile leaf on stipe 0.5-2 cm long, the blade 4-5 cm long, 8-10 mm wide, crenately incised one fourth to one half, with the short lobes separated by open rounded sinuses, each lobe with 2-3 sori, these often very close to the edge with a curved or obtuse tooth or lobe protruding beyond the lower one. I know this species from the Philippines (*Cuming* 335); the Mariannes: Guam (*Née*), and the Carolines; Ponape (*Ledermann* 13383).

Humata heterophylla (J. Sm.) Desv. Rhizome scales squarrose or subappressed, densely and finely ciliate. Sterile leaf on stipe 1 cm long, the blade oblong, acute, 10-15 cm long, 2-3 cm wide, the base rounded or short cuneate, the margins somewhat thickened, quite entire. Fertile leaf on stipe 1-1.5 cm long, the blade 10-13 cm long, 1.5 cm wide, one third to three fourth incised, the lobes oblong with 8 to 10 sori, their margins sinuous, without teeth or lobes protruding beyond the sori, these not close to the edge. Widely distributed in Malaya and Polynesia.

No. 22152 field-note:—Running and forming masses along moss covered inclining tree trunks in a very humid and densely wooded flat; rhizomes very flexible, subglaucous green, slender, rebranched, covered with brown bristles, but the young tips clothed with golden yellow hairs; sterile blades sublucid, smooth, flat, only slightly paler beneath; the strict rather scarce fertile fronds arising mostly from the tips or younger portion of the rhizomes. Quite rare in our district.

Humata vestita (Blm.) Moore

No. 22191 field-note:—Creeping along or upon boulders in dense thickets or jungles; rhizomes flexible, freely rebranched; stipes erect, quite stiff; fronds ascending, paler beneath, the segments flat and rigid.

Hymenolepis mucronata Fée, in *C. Chr.* Dansk Bot. Arkiv 6, No. 62, 1929.

No. 22286 field-note:—Tufts upon moss and scale-moss covered large boulders of the river bed; rhizome short, hard; fronds or blades erect or ascending, velvety dark green above, much lighter green beneath, very stiff at the base; the unequally long fertile tips gracefully recurved.

Hymenolepis platyrhynchos (J. Sm.) Kze.

No. 22199 field-note:—Tufts in small clumps upon moss covered limbs and inclining tree trunks of the peak vegetation at about 6000 feet altitude; fronds descending, quite rigid, paler beneath; the constricted tips bearing upon their nether side a dense mass of yellow spores.

Lecanopteris carnosa Blm.

No. 22092 field-note:—Epiphytic and cleaving about limbs of trees standing isolated in the wind swept river gorge; rhizome fleshy or vegetable-like, glaucous green, short rebranched, compressed and roughened by the old conical stipe bases, honey-combed and inhabited by a small but vicious species of ants; fronds descending, of various sizes, the spore segments upwardly turned but with their faces downhill.

Lindsaya decomposita Willd.

Nos. 22137, 22243 (in part) field-note for the former:—Small clumps in loose ground at the base of a wooded cliff; rhizome crooked, rebranched, not hard but quite short; fronds much recurved especially toward their ends.

Lindsaya humilis Kuhn

Simply pinnate, stipe atropurpureous, veins free.

No. 22243 (in part) field-note:—Tuftlets in loose soil of rather shaded or sheltered places by the reclining trees and shrubs overhanging a sheer drop near the summit of the mountain; stipes and rachis shining black; the fronds widely spreading, the segments lucid above.

Lindsaya merrillii Copel.

No. 22169 field-note:—Terrestrial but climbing, forming masses and running along damp mossy root buttresses of trees in a very wet or humid place; rhizomes branched, shining brown, easily broken, forming masses and tightly attached to their support; fronds numerous, beautifully recurved, of a pleasing green on both sides, the segments thin and flat; the slender rachis shining and straw-colored. An elegant fern.

Loxogramma avenia (Blm.) Presl. *(Polypodium blumeanum (Presl) C. Chr.,* **Index).**

No. 22331 field-note:—Terrestrial ferns forming clumps upon damp humus covered boulders in woods near a precipice; rhizome short, soft, crooked, rebranched; fronds not rigid nor succulent, pale or yellowish green beneath, the margins of the blade wavy; the flattened stipe usually twisted.

Microlepia speluncae (L.) Moore

No. 22237 field-note:—Ground or terrestrial clumps upon wet moss covered stony ground; stems with spreading fronds, erect, several, smooth and blackish brown, 1 to 2 feet long; rhizome rigid, one half inch thick, black, smooth, short rebranched or crooked; fronds beautifully recurved, longer than the stipes, sometimes much longer, paler beneath. A common undergrowth fern.

Microlepia strigosa (Thbg.) Presl

No. 22166 field-note:—Spreading or forming masses in wet earth of humid ravines; rhizome short, bearing few fronds; stems or stipes suberect, about 2 feet long, brown to blackish; frond portion somewhat recurved, as long, dark green but especially so on the upper flat side. ;

Monogramma paradoxa (Fée) Bedd.

No. 22124 field-note:—Dense velvety masses or colonies along sheltered sides of a tree-fern or upon sides of wet boulders in very damp places of woods; fronds very many or numerous, descending, arising from a filiform mass of roots or rhizomes, soft in texture, very dark or dull green. Only occasionally met.

Nephrolepis biserrata (Sw.) Schott

No. 22036 field-note:—A hanging fern from around the basal portion of bird's-nest ferns in wooded ravines; rhizomes rigid, crooked, short, rebranched, blackish to brown; the stiff stipe greenish; the pendent fronds from a few feet to 15 feet in length; pinnae equally shining and similarly green on both sides. A characteristic fern of the woods with its long flexible fronds hanging in a festoon-like fashion.

Nephrolepis cordifolia (L.) Presl

Nos. 22214, 22373 field-note for the former:—In dry ground of ledges or along its edge; tuftlets with wiry long and slender roots; the rhizome very short or none, the roots with characteristic yellowish brown water bulblets one half inch thick and nearly globose or ellipsoid; stipe base rigid, the rachis usually shining brown; fronds ascending or more spreading.

Nephrolepis hirsutula (Forst.) Presl

No. 22213 field-note:—Wiry clumps in or along the river bed; rhizome or root-stock very hard, short, raised above the ground surface, the wiry black roots arising from the stem stump above ground; the hard and rigid stipes erect, dry and remaining when old; the fronds also erect, slightly recurved towards the spore bearing tips.

Polypodium (Crypsinus) accedens Blm.

No. 22153 field-note:—Running and covering small inclining stems and lower limbs of trees in very humid and densely shaded places; rhizomes long, very flexible, branched, slender or filiform, with dirty brown humus gathering rootlets; stipes short yet slender; blades submembranous, those with sori with an extended tip. Very common here as in other middle elevations throughout the Philippines.

Polypodium (Cryptosorus) celebicum Blm.

No. 22236 field-note:—Tuftlets from inclining mossy limbs of shrubs and trees; segments of fronds much recurved upon the paler lower surface, especially so in dry weather. Many of these delicate ferns of the moss laden alpine regions curl themselves up during hot dry days, so as to appear quite different from their normal or expanded condition.

Polypodium (Selliguea) ellipticum Thbg. var. **pothifolium (Hook. et. Grev.)**

No. 22305 field-note:—Small clusters in humus covered ground of deep woods; rhizome rigid, crooked, occasionally curved, yellowish green; stipes smooth, erect or nearly so, green to brown; fronds mostly recurved, a trifle darker green on the upper surface; the stitch-like sori linear.

Polypodium (Microsorium) heterocarpum Blm. *(P. zollingerianum Kze.)*

No. 22033 field-note:—Small clumps or tufts upon shallow humus covered earth among shaded cliffs or bluffs; stipes pale green, ascending, stiffened by the slenderly decurrent leaf blades; fronds much recurved and paler green beneath.

Polypodium (Phymatopsis) lepidosorum C. Chr. sp. nov.

Rhizomate late repente, nodoso, non calcareo, paleis brunneis, concoloribus; peltatis, e basi ca 0.5 mm lata sensim in apicem filiformem attenuatis, medio sat crassis marginibus tenuioribus et sparse fimbriato-ciliatis dense vestito. Foliis remotis, stipitibus 17 usque ad 40 cm longis, stramineis, glaberrimis nudisque. Lamina simplici vel trilobata, herbacea, utrinque viridi, nec punctis calcareis superne onusta, glaberrima, marginibus cartilagineis plus minusque undulato-sinuatis, fertili quam sterili angustiore, basi cuneata, apice longissime acuminata, simplici sterili late lanceolata, 25 cm longa, 4 cm supra basin lata, fertili 25 x 3 cm, trilobata sterili 20 cm longa, lobo mediano 4 cm lato, duobus lateralibus minoribus inaequalibus, adscendentibus, spatio inter costam et sinum 1 cm lato; fertili simili sed segmentis longioribus et angustioribus, 25 x 1.5-2 cm, lateralibus valde adscendentibus, cum mediano fere parallelis. Venis principalibus fere ad marginem distinctis, subtus paulo elevatis, obliquis, 5-6 mm inter se remotis, minoribus tenuissimis, luce transiente solum distinctis, dense reticulatis, areolis venulas plures liberas clavatas includentibus. Soris utrinque uniserialibus, medialibus, superficialibus, ad superficiem superiorem laminae cavis parvis notatis, juvenilibus paleis brunneis angustis, lanceolato-linaeribus perfecte obtectis, maturis paleis delapsis nudis, sporangiis paraphysibus numerosis, filiformibus, brunneis intermixtis.

This remarkable species shows some resemblance to the less divided forms of *P. albidosquamatum Blm.*, and I place it with some doubt in its group (*Phymatopsis*). It differs from it not only by different rhizome-scales and lack of limestone-spots, but especially by the peculiar scaly sori. I have never seen such in any other species.

Elmer No. 22208 field-note:—Small tuftlets scattering upon wet humus covered stones among thickets in a ravine; rhizome rigid, short rebranched, tightly attached; stipes erect, rigid; blades also rigid, very smooth and sublucid above, the fronds simple or forked in both sterile and fertile ones. This new species was growing intermixed with number 22209 or *Polypodium rupestra Blm.*, but I found no difficulty in collecting them separately.

Polypodium (Phymatopsis) longicuspe C. Chr. sp. nov.

P. albidosquamatum Blm. proxime affinis species, differt; colore obscure viridi nec pallide virescenti, pinnis 9-jugis, lanceolatis, ad 20 cm longis 1 cm latis; longissime cuspidatis, venis primariis vix visibilibus, soris superficialibus, submedialibus, paraphysibus perbrevibus.

Though this fern does not show any important character by which it differs from *P. albidosquamatum* and its variety *varians* (*Blm.*), its whole appearance is so different that I venture to describe it as a new species. The scales of the creeping rhizome are dark brown with brighter edges, from a broad, floccoso-ciliate base tapering into a very long hair-like apex. Stipe 30 cm long, glossy brownish to stramineous below, upwards with rachis dark cinnamon-colored. Pinnae alternate, at distances of 4.5 cm, their petioles about 1 cm and like the costae beneath of the same dark colour as the rachis, equally cuneate at base, the cusp up to 5 cm long, with wavy margins, these cartilaginous and quite entire, a single series of very small calcareous dots are found on the upper side along the margins; texture herbaceous, the veins all clearly visible against the light.

Elmer No. 22107 field-note:—Descending tufts from moss and other vine covered tree trunks in humid woods; rhizome rigid, crooked and short rebranched, the young tips clothed with dense soft hair-like scales; stipes and rachis shining black beneath; pinnae rather stiff or rigid, somewhat paler beneath, the segments usually bordered by grayish white lime spots.

Polypodium (Phymatodes) longissimum Blm.

Nos. 22051, 22260 field-note for the former:—Several stemmed terrestrial clumps in shaded seepage places at the neck of the river; rhizome short, thick, rigid, green; stipes suberect, pale green from the base up, smooth; frond ascending, nearly flat and of the same pale green color on both sides; spores in circular pocket pouches.

Polypodium (Microsorium) myriocarpum Mett.

No. 22332 field-note:—Another creeping fern upon wet stones and boulders and forming scattered clusters; rhizome not hard, semi-herbaceous; the erect frond recurved toward the apex, thin, not rigid, its rachis stramineus, very dark green above and with a metallic shine.

Polypodium (Cryptosorus) obliquatum Blm.

No. 22082 field-note:—Small hanging bunches from mossy limbs of trees and stems of shrubs in a very damp sheltered wooded ravine near a stream bed; fronds descendingly curved, darker green above; the stipes are rather rigid for their size, further up reinforced by the reduced pinnae; sori a trifle oblique.

Polypodium (Microsorium) punctatum L.

No. 22330 field-note:—Clustered over stones or upon ledges of a damp densely wooded place; rhizome crooked, rebranched, very hard and rigid, short; fronds thick, also rigid, ascending, flat, somewhat paler beneath.

Polypodium (Crypsinus) rhynchophyllum Hook.

No. 22193 field-note:—Creeping along the mossy covered branches of trees and shrubs; rhizomes thin, very flexible, tightly attached to their support, the young tips clothed with glistening yellow scales; stipes very slender but stiff; fronds or blades rather rigid, erect or nearly so, lucid, somewhat paler on the lower surface.

Polypodium (Pleuridium) rupestre Blm.

No. 22209 field-note:—A more or less creeping fern upon wet stones or boulders in dense thickets; rhizome tightly attached, short rebranched; stipes erect, fairly rigid; the blade quite stiff, more or less recurved toward its tip, paler green beneath, lucid above, very smooth, both sterile and fertile ones diverse in size.

Polypodium (Goniophlebium) subauriculatum Blm.

No. 22037 field-note:—Forming hanging clumps about other epiphytes in humid wooded flats; rhizome rigid, glaucous, crooked, branched; the stipes dark brown; fronds pendent, rather flexible, 3 to 10 feet long, the segments a trifle paler on their inner faces; sori sunken beneath, papillate above.

Polypodium (Themelium) tenuisectum Blm.

No. 22235 field-note:—Little hanging tufts from moss and scale-moss laden limbs of trees and shrubs of the elfin woods at 6000 feet altitude; stipes nearly black; the soft fronds a trifle paler beneath, their sori toward the apex only. A very handsome fern, both in the field and as herbarium specimens.

Polypodium (Pleuridium) zippelii Blm.

No. 22339 field-note:—Creeping upon ledges or over large boulders in a very damp wooded depression; rhizome branched, crooked, greenish, not hard nor rigid; fronds quite thin, erect or ascending, strict or little recurved, pale and similarly green on both sides.

Polystichum sp. of the **P. aculeatum** group.

I dare not name this. In general it mostly resembles *P. obtusum J. Sm.*, but the scales of the rachis are linear and blackish, not broad and reddish, the pinnules broader, 6 mm wide.

No. 22163 field-note:—Coarse ground clumps or tussocks in damp ravines; root-stock a few inches thick, a half foot long or longer; stipes ascending, green, at the base beset with dirty brown scales, up to a yard long; the recurved frond portion nearly as long, lucid and much darker green above. A common species, half dwarfed in dry open places, and assuming a rank form in wet shady places.

Polystichum aristatum (Forst.) Presl sens. lat.

A reduced form, bipinnate with the basal pinnules slightly or not at all prolonged.

Nos. 22127, 22149 field-note for the latter:—Small terrestrial clumps or tufts in damp woods of humus covered ground; stipe erect, green or brown beneath and toward the base; fronds recurved, the segments quite rigid, flat, paler beneath.

Pteris glaucovirens Gold. in *Hieronymus*, Hedwigia 54: 339 ?

Nos. 22126, 22097 field-note for the former:—Coarse clumps in wet earth of deep woods or in talus beds at the base of a bluff; root-stock hard and rigid, few inches thick by several inches long; stipes erect or ascending, up to a yard in length; fronds much recurved, varying from a few inches to a few feet in length.

Pteris longipinnula Wall. ?

A form with unbranched basal pinnae, stipe and rachis of a beautiful blue-green color. I have the same fern species from Borneo.

No. 22148 field-note:—Terrestrial clumps in very damp humus covered ground of woods and forests; root-stock trunk-like, 1 to 2 inches thick, several inches long, reddish when cut; stipes reddish brown. several. erect but recurved toward the frond portion, varying in length; segments of fronds recurved, slightly paler beneath. This species was found growing under the same ecological conditions as *P. glaucovirens Gold.* and is very similar, except for the basal pair of pinnae being simple, not forked.

Pteris tripartita Sw. sens. lat.

A large form of this composite species which is highly in need of a revision.

No. 22167 field-note:—The rankest of our terrestrial *Pteris* species or "brake-fern", at its best in wet fertile soil in humid well shaded and protected gulches at about 4000 feet elevation; stems or stipes arising from a coarse root-stock, green, more or less succulent, strictly erect, 2 yards long or longer, as thick as a man's wrist, bearing at the top a scirpoidly branched frond; pinnae much darker green above, limp and heavy. This same species is occasionally found growing in the Manila gardens, but in a much reduced form from the above description.

Pteris vittata L. (*P. longifolia* **part. auct.)**

No. 22282 field-note:—Ground fern in clumps of sand-gravelly soil along bottom flats of the river; rhizome or root-stock short, rigid, covered by yellowish to nearly black hairs; the dull brown stipes ascending, 1 to 2 feet long; fronds several, longer than the stems, nicely recurved, the basal segments gradually reduced; pinnae dark or dull green.

Sphenomeris chinensis (L.) Max. (*Odontosoria, Index*).

No. 22256 field-note:—Ascending clumps from sand-gravelly ground from around the base of huge boulders along the river; rhizome or root-stock rigid, short rebranched, crooked, covered with dark brown scales; stipes yellowish to brown, rigid and nearly black at the base; fronds pale green especially beneath, smooth, from a few inches to a yard in length.

Stenochlaena leptocarpa (Fée) Und.

No. 22307 field-note:—Climbing along the upper side of inclining tree trunks or crawling over big boulders of a deeply shaded cut-out creek basin; rhizomes stiff, prickly, very dark green or appearing nearly black, occasionally with long branches; fronds very deep or metallic blue-green, strongly recurved; fertile fronds mainly from the terminal portions of the rhizomes, heavy, descending or recurved; the basal blades usually simple and long linear.

Tectaria leuzeana (Gaud.) Copel. sens. lat.

The specimen probably belongs to *Pleocnemia cumingiana Presl* (*Cuming* 107) of which *Aspidium angilogense Christ* no doubt is a synonym. In pubescence and deeply dentate ultimate segments it is much different from typical *T. leuzeana* (*Gaud.*) *Copel.*, and a good species, I think. It seems to be the commonest form in the Philippines.

No. 22086 field-note:—Terrestrial and mixed with a dense tangle of vegetation in a humid well protected gulch; trunk a foot thick and twice as long; stipes nearly one half the length of the spreading frond portion, ascending, brown and covered with similarly colored scales, especially so toward the base; fronds several, 5 yards long or shorter, widely spreading; segments pendently recurved, the basal ones longer and latterly rebranched on the lower side, the apical ones sterile, heavy and paler green beneath. This same species was also collected by me on one of my exploration trips to British North Borneo.

Tectaria polymorpha (Wall.) Copel.

No. 22074 field-note:—Ground tussocks upon deeply shaded ledges covered with dense humus; root-stock erect or nearly so, half a foot long by 2 inches thick, earth colored; fronds 2 or 3 in a clump, 1.5 yards high or long, ascending, but the upper one half or frond portion recurved; laminae thin, lighter green beneath.

Vittaria elongata Sw.

Nos. 22061, 22165 field-note for the former:—Masses or colonies, yet in small tuftlets, hanging from moss and vine covered inclining tree trunks or from logs of a steep densely wooded mountain slope; rhizomes flexible, crooked, branched; the stipe portion quite rigid; blades dull green, yet lighter beneath, pendent from the recurved stipes, unequal in length and most of them with blunt broken-off tips, the longer and broader fronds ribbon-like and somewhat twisted, those of the short and narrow fronds flat and merely recurved.

Three species of **Lycopodium** were collected.

No. 22278 or *L. cernuum L.* It forms colonies in damp ground of tangled thickets. Sometimes the natives collect it for decorative purposes, since the specimens keep green a long time, even in the dry state.

No. 22121 or *L. merrillii Hert.* Usually collected from trees and shrubs, hanging in tufts or bunches. Its live specimens are utilized as ornamental plants by growing them as "tails" from the root-masses of other hanging air plants.

No. 22218 or *L. squarrosum Forst.* This species grows in clumps upon trees, but in our case it was found growing upon the ground of shady thickets. Often it is collected and is similarly used as ornamental hanging house plants in association with other air plants.

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PARASITIC FUNGI FROM MT. PINATUBO

by

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(Berlin, Germany)

In 1927 *Mr. A. D. E. Elmer* collected some parasitic fungi in the vicinity of Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, P. I., — and which collection was forwarded to me for identification. Those numbers which were in a condition to be identified are listed below.

Meliola sauropicola Yates.

On the lower surface of the leaves of *Sauropus robinsonii Merr.* (no. 22306 *Elmer*).

The specimen differs somewhat from the type collection by the extreme variability of the capitate hyphopodia. The smaller ones are mostly ovate or piriform in shape, not lobate, the larger ones club-like, oblong-piriform or even nearly cylindrical, and very irregular in shape, often more or less lobate.

Meliola elmeri Syd.

On leaves of *Pittosporum odoratum Merr.* (no. 21964 p.p. *Elmer*).

Meliola piperina Syd.

On leaves of *Piper interruptum Opiz* (no. 22301 *Elmer*).

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Phyllachora urophylla Hoehn.

On leaves of *Ficus caudatifolia Warb.* (no. 22142 *Elmer*).

Phyllachora catervaria (Berk.) Sacc.

On leaves of *Ficus merrillii Elm.* (no. 21981 *Elmer*).

Munkiodothis melastomata (Hoehn.) Theiss. et Syd.

On leaves of *Melastoma candidum Don* (no. 21931 *Elmer*).

Asterina escharoides Syd.

On leaves of *Pittosporum odoratum Merr.* (no. 21964 p.p. *Elmer*).

Lembosia eugeniae Rehm.

On leaves of *Eugenia llanosii Merr.* (no. 22183 *Elmer*).

This collection may provisionally be considered as a form of the said species, from which it slightly differs by the straight hyphae of the mycelium and the opposite arrangement of the hypnopodia. There have been described — under different generic names — several *Asterina* like fungi growing on species of *Eugenia* from the Philippines and from Amboina which will certainly prove partly to be identical, as has already been stated by me (see Annal. Mycol. 1917, p. 249; 1922, p. 72). This group needs a thorough revision. The different collections do not entirely agree with each other, but it is at present difficult to say whether they belong partly to the same variable species or if several nearly related species are to be recognized.

Prillieuxina microspila Syd.

On leaves of *Leucosyke capitellata (Poir) Wedd.* (no. 21934 *Elmer*).

This fungus has originally been described from Amboina (see Philip. Journ. of Sci. vol. 21, 1922, p. 141). Recently *Mendoza* described an *Asterinella capizensis* (same Journal vol. 49, 1932, p. 189) on the same host plant from Capiz Province. There is no doubt, that they are both identical. *Prillieuxina* is a segregate of *Asterinella* only. Both genera are better to be united.

Uleothyrium clavisporum (Rehm) Syd. Syn.: *Seynesia clavispora Rehm* in Philip. Journ. of Sci. vol. 8, 1913, p. 190.

On leaves of *Alyxia concatenata (Blco.) Merr.* (no. 22363 *Elmer*).

Rehm's description of this interesting species is correct in most details. The thyriothecia, however, are not provided with a central porus as stated by *Rehm*, but they soon break up from the center nearly up to the margin by more or less numerous slits as in the case of many species of *Asterina*. The spores are most peculiar. In most cases the upper cell is a little shorter than the lower one, but considerably broader. The upper cell is broadest about in the middle, tapering suddenly from the widest portion up to the apex, while the lower cell is gradually but strongly tapering from the septum to the base. The total length of the spores is up to 46 micro. They are beset with punctiform little warts densely arranged in longitudinal rows which is best to be seen in the mature brown colored spores. A few spores have been observed in which either the upper or the lower cell showed one or two secondary septa.

Sclerodiscus nitens Pat.

On a small leafed form of *Vaniera (Cudrania) cochinchinensis Lour.* (no. 22321 *Elmer*).

Peltosoma freycinetiae Syd.

On leaves of *Freycinetia ensifolia Merr.* (no. 22144 *Elmer*).

Elmerinula Syd. nov. gen.

Mycelium perisporiaceum, ex hyphis rectiusculis ramosis septatis brunneis haud hyphopodiatis compositum. Setae nullae. Perithecia erecta, breviter stipitata vel subsessilia, late ovata, tenacimucosa, ostiolo nullo vel atypico, pellucide atro-brunnea. Asci pauci in quoque perithecio, ovati vel ovato-globosi, 6-8-spori. Sporae oblongae, 1-septatae, hyalinae.

Elmerinula capnoides Syd. nov. spec.

Semper hypophylla; mycelium plagulas tenues griseas vel atrogriseas per folium irregulariter dispersas saepe confluentes mox

tantum minutas 1-3 mm diam., mox, praecipue confluendo, multo majores et usque plura cm metientes formans, ex hyphis rectiusculis vel curvatis brunneis 3-4 micro. crassis saepsissime pluribus parallele currentibus et conjunctis septatis irregulariter ramosis haud hyphopodiatis compositum; perithecia plerumque densissime stipata, erecta, ovata, pedicello brevi 5-10 micro. longo fulta, antice obtuse conoidea, postice late rotundata, 40-50 micro. alta, 30-40 micro. lata. ostiolo typico nullo; pariete pellucide atro-brunneo, tenaci-mucoso, ca. 5-7 micro. crasso, e cellulis rotundato-angulosis 5-7 micro. diam. metientibus composito; asci pauci (plerumque 2-4) in quoque perithecio, ovato-globosi vel ovati, in maturitate subinde leniter elongati, antice lenissime attenuati, postice late rotundati, subsessiles vel brevissime noduloseque stipitati, 6-8-spori, ad apicem crasse tunicati, 25-35 micro. longi, 18-23 micro. lati; sporae tristichae vel conglobatae, oblongae, antice non vel vix, postice plerumque paullo magis attenuatae, utrinque obtuse rotundatae, rectae vel leniter curvatae, circa medium septatae, leves, hyalinae, 14-16 micro. longae, 4-5 micro. latae, cellula inferiore saepe lenissime angustiore.

Hab. in foliis vivis *Evodia zambalensis Elm.* (no. 22327 *Elmer*).

An interesting fungus which clearly belongs to the *Balladyneae.* All members of this small group up to date known have two-celled brown spores. The present fungus is the first of the group with hyaline spores.

Asterinella hapala Syd. nov. spec.

Semper hypophylla; plagulae sparsae vel aggregatae, tunc saepe confluentes, tenuissimae, aegre conspicuae, griseo-atrae; mycelium ex hyphis haud hyphopodiatis maxime curvato-undulatis intense castaneo-brunneis copiose septatis valde ramosis et anastomosantibus 3.5-4.5 micro. crassis compositum; thyriothecia laxe gregaria, orbicularia vel late elliptica, plerumque 120-160 micro. diam., ad peripheriam plerumque plus minus copiose fimbriata, membrana basali indistincta hyalina; strato tegente leniter convexulo, e seribus radiantibus plus minus fortiter curvatis cellularum intense castaneo-brunnearum 3.5-4.5 micro. longarum et latarum composito, in maturitate copiose laciniatim dehiscente, cellulis partis centralis fere globose dilabentibus; asci globosi usque late ovati, sessiles. 45-60 micro. longi, 38-50 micro. lati, octospori; sporae conglobatae, oblongae, antice late rotundatae, postice subinde leniter attenuatae sed obtusae, paullo supra medium sepatae et plerumque valde constrictae, 23-27 micro. longae, cellula superiore 13-15 micro., inferiore 11-13 micro. lata, ex hyalino tandem intense castaneo-brunneae, verruculosae; paraphysoides parcissime evolutae, hyalinae.

Hab. in foliis *Scolopia luzonensis* (*Presl*) *Warb.* (no. 22324 *Elmer*). A very inconspicuous species.

Asterostomula pinatubensis Syd. nov. spec.

Plagulae semper hypohyllae, sine maculis, singulae minutae et fere orbiculares, sed saepe confluentes tunc majores et irregulares, 1-5 mm diam., tenues, atro-griseae; mycelium ex hyphis densissime intertextis crebre breviterque ramosis septatis valde curvatis et undulatis fuscidulis 2.5-3.5 micro. crassis haud hyphopodiates compositum; pycnidia densiuscule distributa, ambitu plerumque orbicularia, subinde leniter angulata, 50-90 micro. diam., in maturitate irregulariter stellatim dehiscentia et tandem fere usque ad marginem aperta, peripherice plerumque valde fimbriata; strato tegente radiatim contexto, ex hyphis 3-4 micro. latis obscure brunneis crebre septatis (articulis usque 6 micro. longis) constante; conidia pauca, ovata, ovato-oblonga vel anguste piriformia, antice plerumque rotuntada, postice plus minusve attenuata, recta vel saepe etiam leniter inaequilatera, continua, fusca, saepe guttula majuscula centrali praedita, 17-22 micro. longa, 11-14 micro. lata.

Hab. in foliis *Ilex brunnea Merr.* (no. 21957 *Elmer*).

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NEW PLANTS FROM MOUNT PINATUBO

by

A. D. E. ELMER

ANACARDIACEAE

Semecarpus thyrsoidea Elm. n. sp.

A tree; trunk 3 dm thick, its grayish bark smooth and more or less mottled; wood rather soft, whitish; branches short, rigid; twigs not thick, ascending, glabrous, bearing numerous leaves, minutely ridged longitudinally in the dry state. Leaves curvingly folded upon the upper darker green and sublucid surface, paler green and glaucous beneath, glabrous and smooth on both sides, alternatingly scattered and more or less crowded below the infrutescence, ascending or the lower ones divaricate, entire, both ends acute but occasionally the apex obtuse, the larger blades 12 by 3.5 cm without the petioles, the smaller ones 7 by 1.75 cm, narrowly oblong with the greatest width across the middle, chartaceous, curing unequally brown on the two sides; midrib ridged beneath, caniculate above; veins 9 to 14 on each side, conspicuously raised beneath, ascending, their ascendingly curved tips somewhat interarched; reticulations relatively conspicuous on both sides; petioles 1 to 2 cm long, quite slender or only a trifle thickened at the base, glabrous, smooth, caniculate along the upper side, fluted beneath longitudinally. Infrutescence far exceeding the foliage, thyrsoid, rather rigid, erect, 2 dm long by at least half as wide, branched from below the middle but the shorter branches more numerous toward the top, the 3 to 5 cm long main peduncle as well as its divaricate branches and pedicels all glabrous; more or less ridged

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longitudinally; pedicels averaging 1 cm in length, straight and slender, glabrate or probably in the flowering state minutely tawny; young fruit 1.5 cm long, also glabrous, sessile, compressed, the fleshy basal or calyx portion half as long and nearly as wide across the somewhat oblique truncate apex; the nut or seed portion well set upon the calyx receptacle, short elliptic, similarly compressed, shining green in the fresh specimens.

Type specimen number 21965, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in a wooded depression at 4000 feet elevation.—From *Semecarpus cuneiformis Blco.* it differs in its glabrous differently shaped leaves, and in its thyrsoid, not paniculate, inflorescence. For the same reason it cannot be considered *Semecarpus philippinensis Engl.*, which to me seems identical with *Semecarpus cuneiformis Blco.* Somehow its relationship seems to suggest itself with the *Semecarpus glauciphylla Elm.* group.

CAMPANULACEAE

Lobelia nicotianaefolia mollis Elm. n. var.

A rank herb; stem 4 cm thick, pale green, 3 or more m long, reclining especially toward the flower bearing branches, glabrate, hollow and filled with pith; branchlets long and curved, soft puberulent or the older ones becoming glabrate, few, terete. Leaves alternately scattered, diverse in size, the larger blades 3 to 5 dm long by 8 cm wide but most of them smaller, even to bract-like toward the inflorescence, narrowly oblong, apex acute to obtuse, the smaller leaves linearly lanceolate, sharply acuminate to setaceously pointed, attenuate toward the decurrent petiole base, mollis but especially on the paler lower surface, margins very finely serrate or subentire at the base, the bract-like leaves entire; midrib conspicuous, lateral veins 9 to 12 on each side in the larger lamina, much less conspicuous, ascendingly curved; cross bars and reticulations evident, soft membranous in texture. Racemose spike long and ascendingly curved, the stout rachis terete, occasionally with short lateral branches toward the base of the inflorescence, mollis pubescent except the corollas, when old becoming glabrate, the main stalk sometimes a meter long; flowers alternatingly crowded along the entire length, the apical portion bearing flowers, the basal portion in fruit, subtended by linear to setaceously pointed bracts which are at least twice as long as the pedicels, more or less 5 mm long, divaricate, usually provided with a pair of long linear bracts; calyx 1 to 1.5 cm long, the basal one third united into a turbinate tube; the 5 calyx teeth linear and setaceously pointed, green, erect but widely spreading in the fruits, persistent; corolla pale white or lilac tinged, 3 cm in length, the lower half tubular, the upper portion saccate and becoming lobed, thin or hyaline and glabrous, with 5 parallel veins; stamens 2 cm long, included; filaments glabrous or nearly so, forming a hyaline parallel veined tube with an expanded base; anthers about 5 mm long, more or less united laterally, glabrous except the tuft of ciliate hairs from the apex; ovary imbedded, style apiculate. Carpels dry, in 2 halves, dehiscing along their inner sutures, sharply pointed, 12 mm long more or less, oblong, base obtusely rounded, wholly glabrous.

Type specimen number 22181, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in wet ground covered with grasses and low shrubs, on thicketed inclines of dense woods at about 3500 feet altitude.—This species seems to be common in northern Luzon. Foreign specimens so named, and most of our Philippine specimens are glabrous. *Loher's* number 6458 from Mt. Pinatubo I consider the same as my new variety here proposed.

CAPRIFOLIACEAE

Viburnum zambalense Elm. n. sp.

A crooked shrub-like tree; branches and branchlets also crooked, freely rebranched and ascending, the green portion of the twigs glabrate or sprinkled with minute stellular hairs. Leaves opposite, in 2 or 3 terminal pairs, some folded upon the darker green upper surface, others flat and horizontal, curing unequally dark brown; petiole 5 to 8 mm long, glabrate or beset with light brown scales in the young state, relatively slender, broadly caniculate along the upper side; blades entire, membranous, elliptic to oblong elliptic, apex normally acute or subacuminate, the smaller often obtusely rounded, base obtuse to subacute, the average lamina 3 by 7 cm, often much smaller, sometimes larger; midrib very evident, reddish brown in the dry state; lateral veins 5 on each side, less conspicuous but similar in color, alternating, ascendingly curved, the fine cross bars quite evident. Panicle erect, 4 to 7 cm long, all the stalks pale green but dull brown when dry, thickly sprinkled with stellular scales which seem to wear off, branched from and above the middle, the main stalk or peduncle usually subtended by much reduced leaves, branched from above the middle, more densely covered with stellular scales, the ultimate branchlets short or pedicel-like, subtended by short acute to long acuminate ciliate and subpersistent bracts 1 to 3 mm in length; flowers sessile or subsessile, in small clusters, subtended by apiculate bracts; calyx segments glabrous except the sparse ciliate hairs along the edges of the calyx teeth, persistent; corolla creamy white, glabrous, becoming easily detached, up to 8 mm in length, the lower one half broadly tubular, the 5 corolla segments finally reflexed, its lobes broadly obtuse to rounded at the apex; stamens 5, inserted upon the corolla throat and alternating with the segments, erect, also glabrous; filaments flattened, as long or a trifle longer than the corolla; anthers broad, introrse, dorsifixed, bilobed at both ends, dehiscing along the outer edges; ovary imbedded, the 2 mm long style columnar, glabrous, terminated by a sessile stigma.

Type specimen number 22336, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

A low tree or like a shrub, inhabiting a fringe of woods bordering open grass lands at 4000 feet elevation.—The Chinese material of *Viburnum odoratissimum Ker* have larger and thicker leaves, terminating in a rounded apex. Many of our Philippine specimens so determined have apiculate teeth or serratures along their leaf margins. My number 22195 is being distributed under *Ker's* name.

CLETHRACEAE

7

Clethra castaneus Elm. n. sp.

A stunted tree; stem and branches short, crooked, rigid; twigs ascending, often rebranched toward their ends, reddish brown, glabrate, the young or apical portion slightly scurfy and minutely ciliate, castaneous when dry, more or less roughened by leaf scars. Leaves irregularly clustered toward the ends of the twigs, alternate, also ascending; blades nearly flat, glabrous, darker green on the upper side which in the dry state is very dark brown, lower surface of lighter brown or castaneous color, entire, broadly lanceolate, entire, apex acute to subacuminate, base obtuse to acute, 5 to 9 cm long, up to 2.5 cm wide across the middle but often much shorter and narrower; petiole 5 to 10 mm long, subglabrous or somewhat scurfy, ascending, caniculate along the upper side, leaving scars after falling; midrib reddish brown on the ridged lower side, caniculate along the upper side; lateral veins divaricate, their tips ascendingly curved, obscure above, quite evident below, averaging 12 on each side; reticulations none. Inflorescence terminal, erect, equalling or exceeding the foliage, finely scurfy and reddish brown; racemose spikes 5 to 15 cm long, alternately arising and subtended by small leaves, the terminal are usually longer and erect, occasionally short rebranched; flowers alternately scattered along the racemes, ashy green in the fresh state; raceme rachis more or less angular or ridged, short ciliate to scurfy, castaneous when dry; pedicels ascending or divaricate, 1 to 3 mm long, subpersistent, subtended by short ciliate scales; calyx persistent, truncately united at the base, rather thick especially the middle costate portion, subequal, grayish pubescent on the back, finely ciliate along the margins, 3 mm long, imbricate, erect, the 5 segments ovately triangular in shape, apex acute, not broadly rounded; corolla united around the base, deciduous, exceeding the calyx, imbricately folded, glabrous, marginal portion thin, broadly oblong to obovately so, the rounded or subtruncate apex often emarginate; stamens as many as perianth segments, inclosed and set upon the base of the corolla tube; filaments glabrous, thickened and flattened toward the base; anthers oval, 1 mm across, dorsifixed, extrorse, bilobed at the distal end; ovary sessile, obscurely rugose, more or less ciliate; style longer than the stamens, thick, glabrous, usually crooked at the middle, persistent, bearing a thickened or subclavate stigma. Fruit a small subglobose dry capsule or berry with many seeds.

Type specimen numbers 22245 and 22398, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

These specimens were collected in the summit shrubberies of the mountain at nearly 6000 feet elevation.—Its leaves are quite distinct from *Clethra canescens Miq.*, and from typical *Clethra lancifolia Turcz.* it can at once be distinguish by its different calyx.

COMMELINACEAE

7 **Commelina luzonensis Elm. n. sp.**

An herbaceous rambler; stems long and slender, green, soft in texture; branches similar, scattered, slender, glabrous, more or less fluted in the dry state, horizontally spreading, suberect toward their ends; nodes widely scattering, glabrous, in favorable places taking root. Leaves solitary from the nodes, horizontal or ascending, flat, paler green beneath, curing light brown on both sides, glabrous and smooth; blades entire, 1 dm long by 2 cm wide but usually smaller, the terminal ones even bract-like, lanceolate, gradually tapering to the slenderly acuminate apex, base abruptly rounded and attached to the sheath, the midrib lighter colored, the parallel nerves obscure; sheath up to 2 cm long, the lower half united and enclosing the branches, persistent, the free margins toward the top ciliate, the edges of the orifice provided with pale setose bristles, striate, somewhat saccate toward the base. Inflorescence erect, from the uppermost leaf axiles and terminal, glabrous, upon a very slender 1.5 to 2.5 cm long peduncle which bears the spathe with the flowers; spathe divaricate, very pale green in the live plant, thin, glabrous on both sides or minutely stellate, complicate, 3 to 4 cm long, the lower half cordately rounded, 2 cm wide, abruptly tapering into the 2 cm long caudate apex, its parallel veins evident especially toward the base, the basal portion enclosing 2 few-flowered cymes; the upper cyme upon a slender 2 cm long more or less ciliate secondary peduncle, usually erect; pedicels glabrous, those of the older or erect flower 5 mm long, the three lower ones shorter and recurved, all arising from the same point; calyx of 3 nearly equal segments, more or less united at the base, very membranous, oblong or obovate, subequal, 3 to 4 mm long, usually rounded at the apex; petals also 3, light blue, very thin, oblong or oval, truncate at the clawed base, apex broadly obtuse, longer than the sepals or as long; stamens included, three fertile but one much longer and curved, the other two reflexed, the anther cells becoming separated except at the apex; filaments filiform, provided with transparent wings toward the base, 3 to 5 mm in length; the three sterile stamens upon shorter filaments, at the apex divided into a group of 4 pouches or sterile anthers; the spathe enclosed, the cyme with a few more flowers, all recurved in the earlier stages.

Type specimen number 22174, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered among dead limbs rotting upon the ground in thickets of open places in moist ravines of dense woods at 3500 feet altitude.—Apparently it belongs in the group with *Commelina nudiflora Linn.*, but it seems to differ in its larger leaves, setose orifice of the sheaths, and in its wider floral bract extended into a long acuminate apex. Here I also refer *McGregor's* specimen number 195 collected on Mindoro, and which has even a longer pointed floral bract.

ELAEOCARPACEAE

7 **Elaeocarpus zambalensis Elm. n. sp.**

A 3 dm thick tree with rather soft white wood and smooth blotched bark; main branches crooked, numerously rebranched toward the end; twigs erect, slender, terete, roughened with lighter brown leaf scars, the young tips pubescent. Leaves alternatingly crowded from the ends of the branches, subcoriaceous, ascending, dull or darker green on the upper side, the larger blades 2 by 7 cm, broadly lanceolate, the others narrowly lanceolate, curing similarly dull brown on both sides, ultimately glabrous beneath except along the prominent midrib toward the base, entire toward the acute base, otherwise obscurely crenately serrate, apex gradually extended into a rather sharp acuminate point; nerves 4 to 7 on each half, obscure even beneath, ascendingly curved, occasionally with a gland in their axils; petioles slender, 5 to 10 mm long, gray pubescent, leaving rounded scars after falling. Inflorescence spicate, chiefly erect, equalling the foliage, floriferous, yellowish to gray pubescent, arising from the lower leaf axils or clustered immediately beneath them; the relatively short peduncle as well as the rachis grayish pubescent, slender; flowers alternatingly scattered from below the middle of the spike, usually crowded toward the distal end; pedicels divaricate, densely yellowish gray pubescent, thin, usually single but here and there in pairs, somewhat recurved at and terminated by a subpendant flower; sepals 1 cm long, 1.75 mm wide across the truncate base, 5, free or slightly adnate, gradually tapering into the long acuminate apex, the dorsal side and edges short and finely gray pubescent, coriaceous, midvein evident; petals also 5, caducous, free, 1.25 cm long, whitish, subcuneate toward the base, 3 mm wide above the middle, the upper one third divided into a fringe of glabrous setaceous segments, covered with silky hairs on the back below the middle, also with a few hairs on the ventral side toward the base; stamens 24 more or less, erect and forming a column 5 mm long; the slender filaments shorter than the linear anthers, strict, more or less finely ciliate along the edges, apex divided, one of its points much longer and more ciliate; ovary ovoid, densely appressed hairy, sessile and surrounded by 5 double ciliate pubescent glands; style erect, slender, glabrous, exceeding the anther tips, with a minute stigma.

Type specimen number 21943, *A. D. E. Elmer,* Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Found in mixed woods with shrubs in a moist depression at 4000 feet altitude more or less.—Nearest related to *Elaeocarpus gitingensis Elm.* which is very different from *Elaeocarpus verticellatus Elm.* It can be distinguished by its shorter and pubescent leaf petioles, by its densely tomentose inflorescence, by its flowers whose stamens are numerous and whose larger petals are terminated by more numerous and laciniate segments.

EUPHORBIACEAE

7

Gelonium pinatubense Elm. n. sp.

A 2 to 3 m high tree or shrub-like in habit; wood quite rigid, dingy or yellowish white, the bark more or less checked longitudinally; branches rigid, rather few, crookedly rebranched, divaricate. Leaves somewhat paler beneath, sublucid especially on the upper surface, with recurved tips, horizontal to ascending, the mature ones thickly chartaceous, curing greenish brown, not reddish brown, glabrous, alternately scattered along the rigid more or less lenticelled terete and aso glabrous twigs, chiefly 2-ranked, entire, the larger blades 6 by 12 cm but often with smaller ones interspersed, elliptic or broadly oblong, tips varying from obtuse to slenderly to sharply acuminate in most of the leaves, broadly obtuse at the base; petioles 4 to 7 mm long, dull reddish brown, smooth, prominent and reddish brown beneath; nerves 4 to 6 on each side, similar in color, ascending, their tips strongly curved upward, slender, reticulations quite evident from both sides. Male flowers glomerated, chiefly from the fallen leaf axils, usually with a few flowers in anthesis at one time; the subtending bracts persistent, imbricate, very unequal in size and in shape, the outer ones ovate and with acute tips, becoming thick with age and also glabrous; the inner ones larger and much thinner, densely appressed pubescent; pedicel 4 mm long, stout, articulate at or below the middle, pubescent, persistent; perianth segments few, folded ventrally, up to 1 cm in length, obtuse to sharply acute, oblong to lanceolate, base more or less united, hairy on the dorsal middle portion; stamens about a dozen or less, 4 mm long, glabrous, strict and erect, the basifixed oblong anther one fourth the length; the filaments gradually becoming wider toward the base, subtended by ciliate linear bracts and alternating with the subclavate ciliate appendages. Fruits erect or nearly so, bright red or light purple, smooth and glabrous, its subtending segments green, varying from 1 to 2.5 cm long, subglobose, occasionally a trifle trigonous toward the apex, in the dry state prominently 3-ridged from the base to the apex, with secondary ridges in between each of the main ridges or appearing 6-sulcate, murinous in color, usually provided with the old perianth or scars of the perianth segments and the short upper half of the pedicel.

Type specimen numbers 22032 and 21966, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this *Gelonium* in a small wooded flat near the loghouse, elevation 4000 feet.—Very different from *Gelonium philippinense P.* and *H.* based on a Mt. Arayat specimen. Our larger male flowers are pubescent as are also the subtending bracts; leaves greenish brown, not reddish brown, in the dry state; and whose dry fruits are ridged, not trigonous, as are some of the Mt. Mariveles specimens whose leaves match *Pax* and *Hoffman's* species. Also distinct from *Gelonium mindanaense Elm.* whose leaves are quite different from *Gelonium philippinense P.* and *H.*, but which must be considered the same as *Gelonium meliocarpum Elm.*

FAGACEAE

7 **Quercus pinatubensis Elm. n. sp.**

A good sized tree with a 4.50 dm thick trunk; wood rather hard, the gray bark excrescent; the main branches widely spreading, rebranched toward their ends; twigs many, erect or ascending, stout, terete, covered with yellowish white lenticels or excrescences, the young tips glabrous. Leaves alternately scattered, ascending, glabrous, curved or folded upon the upper dark green surface, smooth and somewhat lucid, their tips usually recurved, entire, ovately oblong or the smallest ones broadly lanceolate, gradually extended into the long acuminate point, the base obtusely rounded or broadly obtuse in the smaller ones, grayish to brown on the lower and upper sides when dry, the largest blades 6 by 16 cm, the smaller ones only one half as large, chartaceous; petiole short, 1 to 1.5 cm in length, flattened especially toward the leaf base, curing nearly black, glabrous and smooth; midrib stout, with 5 to 9 slender ascending nerves on each side, the nerve tips more ascendingly curved and faint, the cross bars obscure on the nether side. Infrutescence terminal or arising from the upper leaf axils, erect, up to 2 dm long, the main branch woody and rigid, usually branched from the middle; branchlets comparatively slender, yellowish brown on the herbarium specimens, pubescent or very finely pubescent in the early state, widely spreading in a recurved fashion; female flowers alternately scattered along the entire length of the branchlets, leaving scars when falling; young fruits scattered, sessile, obovoid with thick bases, 1 cm high or long, as wide across the truncate apex, pubescent or short yellowish brown canescent; the cup well covering the young acorn, with several spiral bands of apiculate bracts or scales from the base upwards and circling very closely toward the orifice; or mere circles of blunt upwardly bent apiculate teeth separated by zones except near the upper margins; nut or glan flatly globose, the upper surface yellowish pulverulent when young; style short and thick, apparently surrounded by minute bracteoles; the 3 stigmas glabrous except at the base, erect but their blunt tips divergent.

Type specimen number 22272, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

This rather handsome oak species was collected in heavy or dense woods of a moist deep ravine at 3500 feet altitude.—Leaves very similar in size and shape to those of *Quercus cagayanensis Merr.*, but totally glabrous on the midribs, nerves and petioles; cups in ours grayish brown, not ferruginous, and without the thick pedicellate base.

FLACOURTIACEAE

Casearia luteocarpa Elm. n. sp.

A small shrub-like tree; its wood quite hard, the excrescent bark yellowish and brown mottled; branches many, the branchlets lax, the green and glabrous twigs quite slender and blackish brown, not subglaucous, on the herbarium specimen. Leaves alternatingly scattered in distichous rows, glabrous, shallowly conduplicate upon the upper darker green surface, drying blackish brown, submembranous, ascending or horizontal, the basal lower side of the blades more or less oblique, ovately oblong to broadly lanceolate, apex gradually extended into a sharply acuminate point, base of the larger ones broadly rounded, of the smaller ones broadly obtuse, the larger lamina 8 to 12 cm long by 3 to 4 cm wide across the middle or below it, basal and apical portion entire, otherwise subentire or obscurely crenate; midrib raised beneath, narrowly caniculate above; nerves 7 to 10 on each side of the larger leaves, ascendingly curved, very slender yet relatively conspicuous beneath, reticulations evident; petiole ascending, slender, glabrous, 1 cm long more or less. Flowers greenish, erect, axillary, solitary or few clustered; pedicel relatively thick, 3 mm long, finely pubescent; perianth segments 5, the outer ones leathery and densely canescent on the back and along the edges, also ovately oblong, nearly 1 cm in length, a little over 2 mm wide below the middle, acute at the apex, more or less united at the base, the inner ones less canescent or nearly glabrous; stamens as many as segments and inserted upon their bases, spreading, alternating with minutely ciliated glands; filaments glabrous, 1.5 mm long, somewhat flattened toward the base; anther 1 mm long or less, broadly oblong, basifixed, a trifle broader at the base and obscurely bifid; ovary glabrous, short ovoid, terminated into a short but stout style and minute capitate stigma. Fruit erect or ascending, luteous, subtended by the perianth segments, in the dry state 3 cm long by nearly one half as thick, larger and subterete when fresh, oblong in shape, apiculate, the dry fruits usually 3-sided or angular, often with obscure minor ridges dividing the 3 main lateral sides.

Type specimen number 22309, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in humid wooded flats at 3500 feet altitude.—Allied to the common lowland *Casearia crenata Merr.*, but our fruits are longer and pointed at their ends, not bluntly rounded, rather 3-angular in shape than 6-sulcate, and subtended by calyx segments densely pubescent on both sides. My number 21968 is being distributed under *Merrill's* name.

Hypericum lackeyi Elm. n. sp.

A lax undershrub; some of the main branches quite long or high, freely rebranched toward their ends; old bark brown to somewhat gray, thin, checked or becoming shredded; twigs ascending, slender, reddish brown when dry, smooth, glabrous. Leaves opposite, distinctly punctate especially beneath, regularly scattered, flat, glaucous green beneath, curing reddish brown but paler brown on the nether side, oblong to oblong elliptic, apex subobtuse to acute, base obtuse to subacute, glabrous, subsessile, entire, the larger lamina 1.75 cm across the middle, 4.5 cm long but many of the smaller ones 1 by 3 cm and broadly lanceolate in shape or even with much smaller ones interspersed; midrib reddish brown beneath; the 5 to 7 faint lateral nerves ascending, scarcely visible on the smaller leaves, the tips more or less interarching. Flowers usually solitary from the upper leaf axils but occasionally in 2-flowered or even 3-flowered cymes, erect, spreading, glabrous; pedicels slender, ascendingly curved, 1 cm long, subtended or surrounded at the base by a whorl of glabrous imbricate subpersistent bracts, the larger or longer ones with a pair of bracts from below the middle or when cymose at the point of branching; calyx composed of triangularly shaped teeth, persistent even through the fruiting period; petals also 5, free or slightly united toward the narrowed base, obovately oblong, subequal in size, 1 cm long, rounded at the apex or the broader ones subtruncate and occasionally emarginate, with numerous faint parallel veins, bright yellow: stamens also yellow, arising in 5 phlanges from the basal upper side of the petals, not exceeding the petals in length; filaments erect and curvingly intermixed, filiform throughout, 6 to 9 in each group; anthers basifixed, subpersistent, 0.75 mm long, fully as broad, emarginate at both ends, laterally dehiscing; pistil 1 cm long, erect, ovary narrowly bottle-shaped, the style twice as long and bearing a minutely ciliate stigma. Capsules similar in shape to the ovary, sessile, erect or nearly so, often reddish tinged when mature, 3 to 4 mm thick, 1.5 cm long including the sharply pointed apex, opening from the top down; placenta short-stalked, 5-winged, lanceoloid in outline; the numerous seeds narrowly oblong and beaked, 1 mm long.

Type specimen number 21989, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Upon stony ground of wooded flats near the river or in rock crevices of the river bed at 3275 feet above sea level.—A critical segregate from *Hypericum loheri Merr.*, but our normal leaves are larger, with yellow, not white flowers, larger capsules; the punctate character of our leaves is not evident on *Loher's* specimen number 66. *Foxworthy's* collection from Mt. Pinatubo is the same as our newly proposed species here described. Named after *Maj. John O. Lackey.*

GESNERIACEAE

7 **Cyrtandra pinatubensis Elm. n. sp.**

A laxly branched shrub; the soft wood with a large pith; branches crooked, yellowish gray, at least 1 cm thick but thinner when dry, 4-angular and longitudinally grooved on its sides, glabrate, the younger portions transversely laid with shale scales. Leaves opposite, equal in size, decussate, scattered but mostly toward the distal ends of the twigs, horizontally spreading or the terminal ones much ascending, much lighter green beneath, when dry blackish brown above, dull or yellowish brown beneath, glabrous and smooth on both sides, not shale tomentose, more oblanceolate than lanceolate in shape, coarsely and irregularly apiculate dentate except at the base, nearly flat, the slenderly acuminate apex recurved, the basal portion of the blades attenuate and frequently a little inequilateral, the average lamina 3 by 16 cm when dry but much larger in the fresh or succulent state; midrib stout and raised beneath especially toward the base, dull reddish brown and glabrous beneath, flat along the upper side; main nerves 6 to 8 on each side of the midrib, strongly arching upward, usually with faint secondary nerves in between them; reticulations coarse, quite evident on the nether side of the leaves; petiole 2 cm long, stout, murinous, expanded at the base, toward the top or distal end usually provided with the winged base of the blade. Inflorescence axillary, erect or ascending from very short and very thick glabrous peduncles, 3 cm long by 4 cm wide in the dry condition; bracts more or less united at the broad base, the outer ones broadly elliptic, subhyaline when dry and with 5 to 8 subparallel veins, entirely glabrous, the inner bracts narrower and a trifle shorter; flowers many in a flat water-soaked head and which soon withers into a rotten mass infested by insect larvae, usually their glabrous 5 mm long stipes subtended by bracteoles; calyx 12 to 15 mm long, subcampanulate or tubularly subinflated, transparent and finely striate, the upper one fourth divided into 5 short oblong segments whose abrupt tips are recurved or reflexed, glabrous interiorly as well as externally; corolla white, twice as long or shorter, broady tubular except the upper inflated portion, the apical part divided into 4 unequal and broadly oblong more or less horizontally spreading segments, striately veined as the calyx, glabrous except for the sparse hairs on or around the outside basal portion of the lobes; stamens binate but arising opposite from each other, glabrous; the filaments 1 cm long, compressed, much curved, inserted upon the corolla below the throat; anthers conjugate, bluntly oblong, 2 mm long, dorsifixed; ovary at the base surrounded by an irregularly truncate fleshy and glabrous rim; the ovary 7.5 mm long, erect, bottle-shaped, densely ferruginous hairy except toward the base; neck or style as long, stout, densely covered by short reddish brown glandular hairs; stigma much expanded, discoid, finely brown puberulent.

Type specimen number 22076, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this unique species in wet gravelly ground along stream beds of dark, densely wooded gulches at 3500 feet altitude.— Its alliance is with several Philippine species, but it appears to be nearest to *Cyrtandra cumingii Clark* based on *Cuming* 757.

7 **Cyrtandra quisumbingii Elm. n. sp.**

A very laxly rebranched shrub; the slender branchlets easily breaking, all branches covered with smooth yellowish bark, the terete twigs covered with a brown pubescence especially so toward the young or apical portions. Leaves few, opposite, often quite unequal in size, soft membranous, flat, horizontally spreading or descending, curing very unequal in color on its two sides, the lower surface much lighter even in the fresh materials, many of the laminae appearing unequally sided and obscurely curved or falcate, entire or toward the acute to acuminate apex distinctly apiculate, base obtuse to broadly cuneate and often a trifle inequilateral, broadly oblong in outline, the average blades 5 by 15 cm but often smaller and occasionally larger, the upper surface thinly sprinkled with setose hairs, the lower surface soft pubescent, the young ones dark reddish brown tomentose; midrib prominent beneath and covered with rubiginous setose hairs, occasionally a trifle curved; nerves 7 to 9 on each side, gradually ascendingly curved, similar in indumentum; reticulations coarse and rather obscure, not evident from the upper side; petioles dark or golden brown tomentose, varying from 1 to 4 cm in length. Inflorescence ascending from the leaf axils or even descending, setosely ferruginous pubescent, 2 to 3 cm long, upon a strict peduncle half as long or shorter and bearing at its end a subcapitate or umbellate cluster of flowers; outer involucral bracts lanceolate, 1 cm long, slenderly pointed, with several parallel veins, densely fulvous hairy on the dorsal side; pedicels 5 to 8 mm long, slender, similarly hair covered; calyx a trifle longer, subellipsoid in shape, brown ciliate pubescent except the inside, few striate, the upper one half or two thirds divided into 5 short ovate and setaceously acuminate points which are densely ciliate all around; corolla white, 1 cm long, broadly tubular, expanded at the apex, not campanulate, striately veined, glabrous except for the few hairs on the outside near the throat region, the upper one third divided into 5 short oblong spreading lobes or segments; stamens 2, inserted upon the corolla tube and opposite each other; the glabrous more or less compressed filaments so curved as to place their anthers contiguous; basal rim surrounding the ovary truncate, glabrous, fleshy; ovary narrowly bottle-shaped, also glabrous, gradually extended into the neck or style which it equals in length, only the thick style provided with a few tack-shaped glands; stigma rim-like, fleshy, obscurely rugose on its stigmatic portion.

Type specimen number 22130, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

This undershrub inhabits rather dry humus covered ground of wooded bluffs at 4000 feet above sea level.—Appearing similar to a number of different species, its foliage is especially similar to *Cyrtandra similis Quis.*, but our inflorescence is distinct, especially the size, shape and color of the corolla. Named after *Dr. Eduardo Quisumbiny*, botanist of the Bureau of Science.

7 **Cyrtandra quisumbingii minor Elm.** n. var.

Lax shrub, similarly pubescent; stems and crooked branches yellowish to gray, breaking with a snap, the twigs minutely ridged. Leaves many, ovately elliptic, acute to acuminate, slightly inequilateral and somewhat curved, subcoriaceous, obtuse to obtusely rounded and entire at the usually inequilateral base, otherwise obscurely apiculate, with ascendingly curved nerves on each side of the prominent midrib, upon 1 to 3 cm long petioles, average blades 3 by 8 cm. Inflorescence upon shorter peduncles, more numerously flowered, and purplish tinged.

Type specimen number 22192, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in narrow ravines or deep cuts of the peak region at 5750 feet altitude.

JUGLANDACEAE

Engelhardtia permicrophylla Elm. n. sp.

A scrubby tree; branches widely rebranched, the branches chiefly erect, terete and glabrous; young twigs reddish brown in the dry state, with lighter colored lenticels, more or less ridged longitudinally, up to 5 mm thick, the apical portion deep or yellowish brown scurfy or puberulent. Leaves nearly erect, alternate, curing unequally reddish brown on its two sides, varying from 3 to 9 cm long, imparipinnate, the main stalk or young twig portion from which they arise slender and reddish brown scurfy; petiole 5 to 20 cm long, similar in color and vestiture, very slender, somewhat enlarged at the base, strongly ascending, the rachis like the petiole;

leaflets opposite or subopposite, 7 to 13, sometimes only 5 on the shorter leaves, gradually reduced toward the base, much paler green beneath, flat or only shallowly folded upon the upper minutely scale-sprinkled side, more scaly and reddish brown beneath, slightly inequilateral at the rather broadly obtuse base, apex obtuse to broadly rounded, subsessile except the terminal leaflet which has a short but distinct petiolule, the larger ones 12 mm wide and nearly 3 cm long, elliptic to subobovately elliptic in shape, the smallest ones 5 by 10 mm in size and rotund to obovately rotund; midrib raised beneath, caniculate above, densely copper brown scurfy; nerves quite obscure, ascending, 7 to 9 on each side in the larger blades, the reticulations evident under a lens. Infrutescence from the ends of the year old twigs and below the foliage, the alternating spikes clustered and gracefully recurved, usually less than 1 dm long, the 1 to 3 cm long peduncle and the slender rachis ferruginous scurfy: fruits descending, alternatingly crowded on all sides of the rachis, upon short more or less scurfy pedicels; wings entire, thin, parchment-like or subtransparent, the longer or middle wing 4 by 14 mm, united near the base with the two lateral wings which are considerably shorter, oblong, rounded at the apex, each segment or wing with a prominent midrib and conspicuous nerves which are freely rebranched and forming a net work of veins, all glabrous and minutely scale-dotted; hard nut attached on the inner side of the wing bases, provided with long hairs, ovoid but apex rather pointed and with 2 short styles bearing more or less ciliate stigmas.

Type specimen number 22399, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this rare species among the chaparral formation of the peak region at 6000 feet elevation.—It is very distinct from any of our other Philippine *Engelhardtia* species which have much larger leaflets.

Engelhardtia zambalensis Elm. n. sp.

Small trees; trunk with brown more or less checked bark, its wood rather hard and whitish; main branches crooked, freely rebranched toward their ends; twigs dirty brown in the dry condition, spotted with short elliptic to nearly orbicular grayish white lenticels, the young or apical portion dull reddish brown puberulent or pubescent. Foliage chiefly toward the ends, alternate, membranous, ascending, up to 1 dm. in length, with 5 to 7 or even 9 leaflets; petiole 1 to 1.5 cm long and slender, erect or ascending, it as well as the similarly slender rachis dull brown pubescent; leaflets paripinnate, mostly subopposite, gradually reduced toward the base, the terminal or larger ones 2 by 6 cm, acute to obtuse at the apex, obtuse and subequilateral at and toward the base, the smallest or basal leaflets orbicular and rounded at both ends, subsessile, the largest ones oblong, the smaller ones elliptic to oblong, entire, blackish brown on the upper gabrous side, reddish brown and sprinkled with glistening glands beneath; the raised midrib short pubescent and glandular beneath, caniculate and puberulent above; lateral nerves 5 to 7 on each side of the larger lamina, ascendingly curved especially toward their tips, with few short hairs and glands but soon becoming glabrate, not conspicuous, reticulations obscure. Pendant or curvingly descending spikes soft in texture and very light or yellowish green in the fresh state, 9 to 12 cm in length, its slender peduncle one third as long and more or less sparsely pubescent in the early stages, the rachis slightly pubescent; winged fruits or nuts alternatingly crowded along two thirds of the distal end, subpendant, dry, very short pedicelled, the pedicels provided with ciliate hairs; nutlet hard, long and pale ciliate, ovately elliptic, contracted at the apex into 5 acute to acuminate persistent perianth lobes where they are also ciliate; style exerted, strict, stout, terminated by a brush of stigmatic lobes; the wings hairless, attached to the lower side of the nutlet, straw-colored and subtransparent, persistent, linearly oblong, rounded at the apex, the middle or longer one 2 cm long and straight, 5 to 8 mm wide above the middle, the lateral wings divaricate and about two thirds as long, at the basal portion united and with the middle wing grown to the nutlet; midrib conspicuous, veins less so, reticulations quite evident.

Type specimen number 21972, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in dense woods mixed with shrubs in dry stony ground of depressions bordering grass lands and along the river at 4000 feet.—From *Engelhardtia subsimplicifolia Merr.*, it is separated by its more numerous, thinner and fewer-nerved leaflets, and by its larger wings and longer ciliate nutlets. From *Engelhardtia parvifolia C. DC.* based on *Cuming* 1329 it is distinguished by its broader leaflets, whose upper surface is smooth, not prominently reticulate, and by its larger winged fruits.

LABIATAE

Pogostemon williamsii Elm. n. sp.

Low erect shrub; its stem single or few-clustered; main branches crooked, yellowish brown; twigs usually few-clustered from nearly the same place on the branches, suberect, tawny pubescent, subterete but distinctly angular toward the leaf bearing ends. Leaves opposite but alternately scattered, subcoriaceous, folded, velvety dark green above, much paler green beneath, curing gray to yellowish brown beneath and nearly black on the upper side, finely ciliate above, soft tomentose beneath, ascending, also soft in texture, apex gradually acuminate, base entire and broadly obtuse to rounded, obscurely crenate, oblong to ovately oblong, the larger blades 10 cm long, nearly half as wide just below the middle, frequently with smaller ones; midrib stout, densely yellowish gray tomentose even along the upper side; lateral nerves indistinct, oblique or suberect, similar in vestiture; reticulations more evident on the upper side than on the lower side; petioles erect, 1.5 to 3 cm long, stout, soft tomentose. Spikes erect, terminal, strictly erect, the flower bearing ones at the top and exceeding the foliage, the persistent seed bearing ones below or not exceeding the foliage; peduncles of the flowering spikes short, angular, similarly tomentose, stout, subtended by small leaves or foliaceous bracts, the peduncle of the seed bearing spikes three to five times as long and subterete; flowers subtended by linear bracts fringed with hairs, in dense whorls or half whorls, crowded from the base toward the apex or from 5 to 12 cm in length, anthesis proceeding from base toward apex; calyx subsaccate or subtubular, when old subparchment-like and subcarinate, 1 cm long, upon a short finely ciliate pedicel, 5 to 10 parallel-veined, subhyaline, sparsely hairy along the outside, persistent, the 5 sharply acuminate teeth with thickened margins and long hairy on the outside only; corolla few to several mm longer, dark or deep blue, its tube tapering from the base to the unequal bilobed throat, hyaline, striately veined, glabrous, the upper lip reflexed and pointed, the lower lip portion divided into 3 subequal lobes which are also more or less recurved, larger in size and bluntly pointed; stamens 4, as long as the corolla and inserted upon the tube a trifle below the throat; filaments very slender, much curved and widely spreading, forming interlaced entanglements, their bases crooked or much curved and short reddish brown hairy, along their middle portion provided with long hyaline septated hairs, glabrous otherwise; anthers small, subrotund in outline, basifixed to the usually recurved ends of the filaments, dehiscing by an apical transverse slit; ovary glabrous, its thick pedicel bearing 4 subglobular lobes.

Type specimen number 22225, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected this *Pogostemon* in gravelly ground and in rock crevices near the river at 3500 feet elevation. It is quite ornamental with its velvety dark green foliage and its deep blue flowers.—In 1904 I collected in the mountains near Baguio number 5912 which is here considered the same species, and which is not *Pogostemon velatus Benth.*, based upon *Cuming* 1097. *Mr. R. S. Williams* also collected it in the vicinity of Baguio during the same year, and I take pleasure in naming it after him.

LEGUMINOSAE

7

Dalbergia pinatubensis Elm. n. sp.

A scandent and rambling shrub; stem tough, brown, excrescent, glabrous; the young twigs puberulent or finely rusty brown pubescent. Leaves coriaceous, alternatingly scattered, abundant, up to 1 dm in length, 5 to 9-imparipinnate; the leaflets descending, very lucid and glabrous above, the entire margins subinvolute, beneath sprinkled with short or fine hairs, obtusely to truncately rounded at the apex, base obtuse and slightly inequilateral, the upper ones often subcuneate upon a short but distinct petiolule, paler beneath both in the fresh and dry condition, 3 cm long by one third as wide, easily falling, most of the lower leaflets smaller, curing unequally dull or blackish brown on the two sides; midrib prominent beneath, sunken and with few hairs on the upper shining surface, the nerves or veins few and scarcely visible; peduncle with the rachis very slender, the former one third the length of the leaf and thickened at the base, finely ferruginous pubescent but with age becoming glabrate. Inflorescence erect or ascending, fulvous puberulent or finely pubescent, upon woody stalks varying from 5 to 15 cm long; branchlets 3 cm long, finely rebranched from near the base, tawny tomentose, most of the alternating branchlets subtended by broad subpersistent bracteoles; the slender pedicel 2 to 3 mm long and pubescent; calyx deeply cup-shaped, very pale green when fresh, 4 mm long, divided into 3 small segments and into 2 broad and veiny segments, glabrous except for the few ciliate hairs around the tips of the segments, subtended by 2 thickly rotund and pubescent bracteoles; petals pure white, also glabrous; the banner 7 mm long including the stipitate claw, the upper one half or lamina portion oblong and veiny, base of the lamina subhastate on both sides; wings free, equal in length to both the lamina and stipe, also veiny, apex rounded, base sagittate; keels more or less united toward the broad apical sinus, the base truncately lobed on one side of the lamina, very slenderly clawed or stipitate; stamens 10, fertile, the unequally long free ends upwardly curved, otherwise the filaments are united into a broad tube, about as long as the petals and inserted upon the basal portion of the calyx cup; anthers minute, basifixed; ovary linear and compressed, upon a slender stipe, terminated by an appendage, distinctly 4-ovuled, glabrous as are also the stamens.

Type specimen number 22094, *A. D. E. Elmer,* Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in jungles along a dry deep creek cut of the open grass lands at 3250 feet.—This species clearly belongs to *Dalbergia pinnata Lour.* group of plants, with membranous leaflets and whose margins are not involute. Our specimens have fewer leaflets which average twice as long and wide, and our 3 or 4-ovuled ovaries will no doubt produce a different fruit than that on *Merrill's* variety.

Derris zambalensis Elm. n. sp.

A tough, rambling and twining shrub; stem terete, 5 cm thick, with hard or tough white wood, the brown bark roughened with excrescences; branchlets forming tangled masses, dull brown and densely covered with lighter colored lenticels, glabrous. Leaves copious, oddly or imparipinnate, few to several alternating from short twigs or the upper ones solitary, 10 to 15 cm long including the petioles; leaflets 5 to 9, opposite, narrowly oblong, paler beneath in the fresh state, rufous brown in the dry state, nearly flat except the acute recurved apex, base obtuse to obtusely rounded. the entire margins subinvolute, curing unequally dull brown on the two sides, the terminal leaflets usually somewhat larger, coriaceous, glabrate on the upper surface, 2.5 by 7 cm but frequently smaller, the lower side densely covered with appressed ferruginous hairs, upon a few mm long and rather stout petiolule; petiole enlarged at the base and with a blunt pubescent stipule, it as well as the rachis finely rubiginous pubescent, the rachis extended at the distal end and terminated by a single leaflet; midrib ridged beneath, impressed and strigose along the upper side, it as well as the 5 to 7 ascendingly curved nerves covered beneath with appressed reddish brown hairs, reticulations obscure. Infrutescence terminal or from the uppermost leaf axils, 2 dm long, sparingly rebranched, subpaniculate, densely short rufous brown tomentose, the branchlets rather slender; pedicels up to 5 mm long, mainly persistent, similarly pubescent, subtended by short bracts; pods pendant, yellowish green in the field, 3 to 5 cm in length, 1 to 1.5 cm wide, base truncately rounded, apex similar but more or less oblique and with a short point in the sinus, rufous tomentose on both sides, very thin or submembranous, subtended by a similarly pubescent shallow calyx cup, upper suture 3 mm below the wing-like edge of the pod, suture along the opposite edge submarginal, reticulations evident, 1 to 2 or even 3-seeded.

Type specimen number 22053, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

In dense jungles of dry woods or thickets along a creek bed at 3500 feet elevation.—Not having flowering specimens it is somewhat difficult to place it, yet it seems to come nearest to *Derris polyantha Perk.*, a low hill species of middle Luzon. Our darker brown leaflets are pubescent beneath in the mature state, are gradually tapering toward their apices, not obtusely rounded nor distinctly emarginate at their ends.

LORANTHACEAE

Loranthus maganda Elm. n. sp.

A parasitic shrub; stems several, a meter long or longer, freely rebranched; twigs stout and rigid, crooked, gray, terete, the young green and slender portion glabrous. Leaves in whorls of 4, pale green, rigid and thickly coriaceous, entirely glabrous, ascending, the internodes varying from 3 to 10 cm long, the node becoming enlarged, 4 by 10 cm but frequently only half that size, numerous toward the ends of the branchlets, all sizes oblong in general outline, apex obtuse to acute, base obtuse, occasionally but usually subcuneate, smooth and darker green on the upper sublucid side, when dry dull brown above and yellowish brown beneath; petioles very stout, also glabrous, murinous when dry, 5 to 10 mm long, flattened on the upper side, leaving circular scars after falling; midrib very thick beneath toward the base, blackish brown on the herbarium specimens, gradually disappearing toward the apex, nerves obscure, reticulations not evident. Flowers in great profusion from the stems but especially along the branches, not axillary, promiscuously scattered all about the woody twigs so densely as to conceal it; cymes short, few-branched if any; the final branches or pedicels very short, articulate, subtended by relatively short bracts, in the early state rusty brown pulverulent but ultimately glabrate; main peduncle few to several mm long, terete, rather stout, similar in vestiture, leaving circular scars upon falling other than the much larger nodal leaf scars; the individual flowers in small subumbellate clusters, their pedicels 1 to 1.5 mm long, articulate and usually subtended by subapiculate bracteoles; calyx also articulate, turbinate, 2 mm in length, the widened apex truncate and minutely brown ciliate, similar and with a ferruginous pulverulence; corolla tubular, strigosely pubescent on the outside, glabrous inside, 2 cm long or less, linear, miniatous but yellowish toward the throat, the segmented portion green; segments 4, reflexed, narrowly oblong, their tips very blunt, straight and adnate before opening, ultimately splitting clear down along the striate tube; stamens 4, erect, opposite the segments and inserted upon the throat; filaments short, flattened, slightly brown woodly at the base and which is adnate to the tube; anthers linear, a trifle shorter than the corolla segments; style slender, subterete, glabrous, exceeding the stamens, bearing a small stigma.

Type specimen number 22319, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected this most beautiful *Loranthus* upon the limbs of a *Laportea* tree at 3500 feet altitude.—In my description I called it "parasitic" which it is no doubt in part at least, but the plant bears an abundance of pale or yellowish green leaves. While collecting this species my *Negrito* helper exclaimed "Maganda, maganda," which means in his dialect "beautiful."

MELASTOMATACEAE

7 **Astronia zambalensis Elm. n. sp.**

A small stocky tree; wood soft, whitish, its bark gray to brown; twigs sharply angled, very thick and crooked, the young 4-ridged and bendable, furfuraceous. Leaves rather few, opposite, coriaceous, entire, elliptic, ascending, glabrous and sublucid above, the nether side yellowish brown, when old subglaucous brown, fairly flat and somewhat rigid, the average blades 9 by 17 cm but both larger and smaller, apex obtusely rounded and terminated by a short apiculate point, base broadly obtuse or obtusely rounded; midrib stout and raised, with a primary pair of nerves arising 5 to 10 mm above the base and curvingly extending into the apex, its secondary pair of nerves running along 3 to 5 mm below the margin and disappearing at their ends, all densely covered with a dark ferruginous scurf; cross bars distant and prominent; reticulations forming a broken line a little over half way between the midrib and the main pair of nerves, otherwise the reticulations faint and coarse, often forming secondary bars; petioles exceedingly thick, scurfy brown, flat along the upper side, leaving large scars after falling, 3 to 5 cm long. Inflorescence short paniculate, terminal, erect, very rigid, 8 cm high, 12 cm wide, oppositely branched from near the base, the stout main axils as well as the main branches decidedly angular, the secondary branchlets divaricate and from above the middle of the main branches, all scurfy ferruginous brown; flowers mostly in terminal clusters, upon short quite thick pedicels; the cup hard or rigid, truncate or obscurely 5-apiculate; it with the persistent pedicels brown scale covered; petals 5, fugacious, free and well separated, nearly 3 mm long, oblong or subrotund, concavo-convex except the thickened flattened base at which it is strongly reflexed, dull or lemon yellow even on the dried material; stamens as long or longer than the petals, twice as many, forming an erect rim, also glabrous; filaments flat and rather wide, coriaceous, rigid, free or connate at the base, at the apex sharply crooked and abruptly constricted into a mucronate point to which the subglobosely rounded anthers are attached; style terete, columnar, a trifle longer than the stamens, glabrous, the apex slightly discoid and which bears a fringe of minute hairs around its edge.

Type specimen number 22065, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered only one tree in a densely wooded jungle among the grass lands near the ridge of the mountain chain at 4000 feet elevation.—It can be likened to a number of Philippine species, the venation of our leaves is similar to *Astronia ferruginea Elm.* from Mt. Apo, but not that of the variety.

Medinilla negrito Elm. n. sp.

A very laxly branched shrub; its yellowish wood covered with somewhat shredded bark; main branches widely spreading, slender, not numerous; twigs thin, yellowish gray, usually marked with faint wings, glabrous, smooth but roughened with brown lenticels or excrescences; the very slender young portions dull brown when dry, also glabrous, smooth, subterete or obscurely angled and faintly ridged. Leaves opposite, well scattered and widely spreading horizontally, flat but with recurved tips, paler beneath, dark velvety or sublucid green above, subcoriaceous, curing blackish brown on both sides, oblong or subelliptic, entire, gradually tapering into the rather abrupt and sharply acuminate point, base acute to obtuse, sometimes obtusely rounded, glabrous, the average laminae 5 by 12 cm in size; midrib pronounced beneath, with a primary and secondary nerve on each side, the former pair arising 1 cm above the base of the blade and curvingly extended into the apex, the latter arising from the base and running 3 to 5 mm submarginally into the apex, cross bars faint, reticulations not evident; petioles 1.5 to 2.5 cm long, quite slender, smooth and glabrous. Inflorescence terminal, erect, green and the very young portions appearing minutely granular, up to 1 dm long, sparingly rebranched, the main pair of branches at right angles, the secondary branches mostly toward the ends and bearing few flowers; pedicels 1 cm long, nodulose or subconstricted at their ebracteolate bases; calyx thick, appearing granular when dry, narrowly cup-shaped, apical rim truncate, occasionally with 5 apiculations around on the outside of the rim, 5 to 8 mm long; petals 4, thin, free or nearly so, obovately oblong, rather wide toward the rounded top, spreading, up to 2 cm long, early falling; stamens glabrous as are the pale white or pinkish colored petals, 8, nearly erect; filaments narrowly ribbon-like, curved and interlaced; anthers of 2 lobes or rounded pouches and with a thick blunt basal spur, the greater terminal length setaceously pointed, the points with broad purplish red wings along each edge or side upon the lower face; style subterete, equalling the stamens or longer, entirely glabrous, terminated with a small capitate stigma. Fruit subglobose, 1 cm in diameter or larger, filled with numerous seeds, deep red and soft when mature.

Type specimen number 22374, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this *Medinilla* in a very densely and deeply wooded cut, in wet stony soil along a streamlet with a series of small waterfalls at 4000 feet elevation. "Negrito" is the English name of the tribe of natives inhabiting the Zambales mountains.—*Medinilla versicolor Elm.* from Mt. Apo is quite distinct from the mass of specimens from Luzon and named *Medinilla astronioides Trian.* Furthermore, our specimen in hand is different from the rest of the specimens under this cover, except 206 *Whitford* from Mt. Mariveles which is a good match. My specimens 17832 and 17946 from Mt. Maquiling have ovately rotund leaves with broadly obtuse to rounded bases, but only 5 nerves (including the midrib) can be counted.

7 **Melastoma pinatubense Elm.** n. sp.

An erect shrub; bark of stems and branches yellowish brown; main branches numerous and usually oppositely rebranched; twigs erect or ascending, slender, subterete, reddish brown when dry, roughened by the lighter colored scale-like hairs. Lower leaves descending, upper ones ascending, sublucid and much darker green above, green beneath in the dry state, submurinous above, entire, opposite, broadly obtuse to obtusely rounded at the base, apex sharply acute and terminated by a small sharp point, oblong or the smallest ones broadly lanceolate, averaging 2.5 by 7.5 cm without the petiole, the upper surface sprinkled with yellowish gray cystoliths, scabrous on both sides, the lower surface with minute spinules chiefly along the nerves, cross bars and reticulations; the midrib with 2 subparallel nerves on each side, all conspicuous beneath and caniculate along the upper side, the nerves arising from the base and connivent at the apex, covered with yellowish brown appressed and upwardly pointed scales; the parallel cross bars also conspicuous beneath and beset with small spicules; petiole up to 2 cm in length, reddish brown and likewise covered with appressed scales. Inflorescence erect, terminal or from the upper leaf axils, short cymosely branched, bearing few to several flowers, 2 to 3 cm across, usually subtended by small lanceolate or foliaceous bracts, all covered by tawny colored scales; the short branches relatively thick, scaly; pedicels from 5 to 8 mm long, articulate and subtended by a small bract and by longer scales at the base, imbricately covered with light yellowish brown scales; ovary with segmented portion 15 mm long, the basal half cup-shaped, densely covered by imbricate light tawny colored scales, truncate when old; segments lanceolately oblong, setaceously pointed, scaly on the dorsal side, deciduous, usually twisting with margins overlapping; petals free, 5, caducous, 2 cm long, obovate, striately veined toward the base, thinly membranous, pink or purplish red; stamens 10, half fertile and half sterile, glabrous; the filaments of the fertile ones strongly crooked at the middle and bilobed at the knee; the anthers lanceolate, 8 mm long, attached to the base of the thick connective, the cells rugulose toward the base; style also glabrous, 2 cm long, subterete; stigma small.

Type specimen number 22233, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered from among the scrub thickets near the summit of the mountain at 5750 feet elevation.—Chiefly characterized from *Melastoma holmani Elm.* by its foliage and by its longer, more sharply acuminate and scale-covered calyx segments.

MELIACEAE

Aphanamixis pinatubensis Elm. n. sp.

An erect shrub; its crooked stem is sparingly branched, the branches also crooked; twigs few, thick. Leaves horizontal or descending, 1.5 m long, not many, alternating, only toward the ends of the branchlets; rachis light tawny velutinous but with age becoming glabrate especially the stout peduncle which at the base is much enlarged, densely yellowish brown velutinous toward the distal end, rigid and suffrutescent; leaflets subchartaceous, imparipinnate, the several pairs well scattered, the average 2 to 3 dm long, 6 to 8 cm wide, chiefly horizontal or the much reduced basal ones ascending, while the largest or terminal one are descending, apex rounded and abruptly constricted into an acute to acuminate point, base obliquely obtuse to acute and with the lower edge straight and narrowly extended, the upper half much broader, soft tawny pubescent especially on the lighter colored lower surface, the margins distinctly wavy or undulate, the edges minutely involute and densely covered with yellowish brown hairs, sparsely pubescent above except the midrib and nerves; petiolules leaving conspicuous scars upon falling, 5 to 10 mm long, thick, similarly pubescent, that for the central and terminal leaflet 8 cm long; midrib stout and conspicuously raised, less so on the upper side; nerves 10 to 16 on a side according to the size of the blade, rather straight and ascending, the upwardly curved tips usually interarching, more pubescent and pronounced beneath; cross bars quite evident, reticulations obscure. Infrutescent spike axillary, usually solitary from a leaf bearing branch, 1.5 m long or equalling the few leaves in length, pendant; fruits alternatingly crowded along the distal half of the rachis, divaricate or ascending, upon falling leaving conspicuous oblong scars, 3 cm long by 2.5 cm across, subglobose, obscurely trigonous or occasionally compressed, minutely stellate when young but soon becoming glabrous and shining red, dehiscent from the apex, containing 3 oblong shining black seeds 1.5 cm long; the carpels abruptly constricted at the base into a short thick stalk which is subtended by a bluntly-toothed pubescent and persistent calyx; rachis finely pubescent along the fruit bearing portion, the long peduncle much thickened at the base, stout yet flexible.

Type specimen number 22179, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in very damp woods among other shrubs and low trees at about 4000 feet altitude.—Its pubescence is very similar to *Aphanamixis velutina Elm.*, but its foliage is very different.

MORACEAE

Ficus zambalensis Elm. n. sp.

A medium sized tree; trunk 4 to 5 dm thick, widely branched, its smooth bark grayish white and more or less blotched; twigs or branchlets ascending, 1 cm thick and wrinkled when dry, reddish brown, glabrate or nearly so, light rusty brown pubescent at the young tips. Leaves oppositely crowded at the ends of the suberect branchlets, leaving ring-like scars after falling, usually somewhat folded upon the darker green and sublucid upper surface, submembranous, entire, glabrous and darker brown on the upper dry face, much lighter brown and soft pubescent on the under surface, the lamina ovately rotund, 12 by 18 cm but more often smaller than larger, rounded at the top and abruptly terminated in a short sharply pointed apex, broadly rounded or shallowly cordate at the base; midrib pronounced beneath, flat and sometimes with a few strigose hairs along the upper side; nerves 5 to 7 on each side, oblique, nearly parallel, also prominent and densely covered with soft hairs, the basal pair of nerves with 7 to 9 secondary nerves along their lower sides, cross bars quite evident, reticulations fine and obscure; petioles 2 to 5 cm long, thick, tomentose; bud bracts imbricate, 1 cm long, ovately acute, leathery, densely covered with yellowish to gray appressed hairs. Figs clustered about the twigs immediately below the foliage, dull green when collected; pedicels 5 to 8 mm long, relatively thick, ferruginous tomentose, subcompressed or obscurely angular, at the apex provided with 3 small triangularly acute bracts which are also hairy on the middle dorsal side; receptacle ovoidly globose or broadly ellipsoid, 2 by 3 cm in the dry fruits, densely yellowish brown tomentose on both the exterior and the interior, terminated by an erect whorl of thick subglabrous umbilical scales; inner bracteoles thinner and numerous; fertile flowers very numerous, 5 mm long, their hyaline and flattened stipes half as long, the yellowish ovoidly compressed ovary subtended by a whorl of dull reddish brown perianth, usually divided into 5 subequal segments; style subterminal, slender, terminated by a flatly expanded stigma; receptacles clothed on the inner face with many light colored hairs; mature achenes rugose, stramineous.

Type specimen number 22271, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered this fig-tree in damp dense woods at 3750 feet altitude.—Distinct from *Ficus paloensis Elm.*, a specie more or less confined to Leyte, Samar and Surigao. It differs from *Ficus ruficaulis Merr.* in its smaller more pubescent leaves whose apical portion is rounded and terminated by a relatively short and sharp point, not at all gradually tapering into an acuminate apex; our receptacles are also more hairy on both the exterior and interior.

OLEACEAE

7 **Ligustrum glabrinerve Elm. n. sp.**

Burly tree or coarse shrubs; branches crooked, numerously rebranched toward the ends, the branchlets erect or ascending; wood hard, reddish tinged toward the center; bark gray, scaling in thin plates; twigs slender, glabrate, short rebranched, dotted with small oblong whitish lenticels. Leaves glabrous, opposite, more or less conduplicate upon the upper shining and darker green surface, ascending or divaricate, well scattered, subcoriaceous, entire, varied in size, curing dark or dull reddish brown, acute to acuminate, sometimes even obtuse at the apex, base obtusely rounded even in the smaller ones, the largest lamina 2.25 by 6 cm, the smallest ones less than one half as large; petioles glabrous, thin, 3 to 5 mm long, very dull brown; midrib nearly of the same color beneath; nerves glabrous, 4 to 7 on each side, very faint even below, strict, ascending, their tips more or less interarched. Panicle terminal, erect or nearly so, up to 8 cm long by 5 cm wide toward the base, usually subtended by a pair of reduced leaves or leaf-like bracts; the lower or longer branches subtended by similar bracts, ascending, the branches as well as the rachis slender and minutely puberulent: flowers pure white, clustered upon short branchlets, usually along the upper half of the main branches, the short branchlets subtended by puberulent bracts; the lateral flowers subsessile, the central or terminal one short pedicelled; calyx obovoid, 2.5 mm long, narrowed toward the base, widest across the truncate apex, glabrous; corolla 3 to 5 mm long, also glabrous, the basal one half united into a tube and inserted upon the calyx rim, its 5 oblong lobes obtuse at the apex and in anthesis reflexed; stamens as many, inserted upon the corolla tube, the free glabrous filaments exceeding the corolla segments, mostly erect, not reflexed; anthers somewhat recurved, 2 mm long, basifixed, one third as wide, bifid at both ends; style straight, erect, glabrous, about equalling the corolla lobes in length, the enlarged apex divided into 2 stigmatic lobes.

Type specimen numbers 22247, 21963 and 22312, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered in the alpine chaparral formation of the summit region at 6000 feet altitude.—A very pretty and ornamental shrub or tree with its shining glossy green leaves and pure white flowers! This glabrous alpine plant should be kept distinct from the common low country pubescent *Ligustrum pubinerve Blm.*

RUBIACEAE

Lasianthus zambalensis Elm. n. sp.

A slender and lax shrub, with moderately hard wood and smooth yellowish gray bark; the rigid branches green, only occasionally rebranched, the terete twigs slender and glabrous. Leaves shining and darker green above, nearly flat, chiefly horizontally spreading, the long or slenderly acuminate tips recurved, mainly opposite and well scattered, submembranous, dull green or nearly so when dry on both sides, the larger blades 4 by 10 cm, oblong to narrowly so, the smallest leaves only half as large and broadly lanceolate to oblanceolate, base acute to sometimes obtuse, entire below the middle, otherwise obscurely crenately undulate or subentire, glabrous; midrib pronounced beneath, glabrate, the 5 to 7 lateral nerves less prominent, their tips much ascendingly-curved, cross bars faint; petiole 1 cm long or less, slender, the lower side sparsely provided with short hairs or with age entirely glabrous; apical bud bracts 1 cm long, densely golden brown pubescent, the two larger ones usually curved or twisted especially the slender free points. Old flowers in dense axillary glomerules, sessile, the whole interaxillary region of the stem and leaves more or less finely light brown pubescent in the early stage, the short bracts or bract scars usually covered in the early state with similarly colored hairs; calyx subturbinate, 3 to 4 mm in length, a trifle narrower across the top, with 5 ciliate and acute segments, upon a very short and relatively very thick and densely pubescent pedicel which is either subtended or surrounded by shorter and ciliate margined bracteoles; ovary top glabrous and wheel-like, otherwise globose, up to 5 mm long and a trifle narrower in the fresh condition, the apex usually provided with the shrivelled calyx segments, when mature shining smooth and wash-blue, drying murinous, with 5 bony seeds whose two inner sides are nearly plane and having a common inner edge, their outer side convex.

Type specimen number 22045, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this *Lasianthus* with other scrub vegetation upon a ledge of a stream near the camp at 4000 feet.—It is not *Lasianthus microphyllus Elm.*, neither does it appear to match *Lasianthus tashiroi Mats.* from Formosa.

7

Mussaenda pinatubensis Elm. n. sp.

Shrubs with rather tough and dingy white wood and smooth brown bark; the main branches spreading, with many terminal branchlets; twigs subangular, erect or ascending, relatively short, dull brown and with light colored lenticels, opposite, gabrous, terminated by the leaf and flower bearing portion. Leaves also opposite, often unequal in size, membranous, most of them curvingly folded upon the upper darker green surface, curing unequally brown on its upper and lower sides, entire, cuneate at or toward the base, entire, apex sharply or slenderly acuminate but many of the smaller leaves obtuse and with a short point, glabrate except the sparsely hairy midrib and nerves, the average blades 4 to 7 cm long, 2 to 3 cm wide above the middle, broadly oblanceolate or oblong with widest portion above the middle, some few of the smaller leaves subobovate; midrib quite evident toward the base, sprinkled with appressed hairs; lateral nerves 6 to 10, faint, sparsely pubescent on the under side, ascending or oblique and subparallel, reticulations faint and obscure; petioles 5 to 10 mm long, grooved along the upper side, sparsely strigose beneath; the interaxillary bracts 5 to 8 mm long, lanceolate, yellowish gray tomentose on the outside, in the early state 2 or 3 laciniately pointed; the axillary bracteoles also pubescent, imbricate, very short and broad, with sharp points, subpersistent. The cymose inflorescence almost equalling the foliage in length, terminal, the slender subglabrous peduncles axillary and subtended by a normally sized leaf, branched from the middle and above it; branchlets divaricate, opposite or more numerously branched on one side than on the other, all subtended by sharply pointed lanceolate to linear more or less hairy bracteoles; pedicels 3 mm long, subtended by bracteolules; calyx 1 cm long, the narrowly oblong ovary portion subglabrous and nearly as long; the 5 setaceous segments spreading, persistent, thinly pubescent, occasionally the outer segments develops into a large yellowish white horizontally spreading subelliptic to broadly lanceolate severally-nerved bract; corolla 2 to 3 cm long, the tube thickened toward the top and canescent on the outside except toward the sublabrous base; segments 5, short ovate, terminated with a subcuspidate point, strigosely pubescent on the outside, deep yellow or orange red, rotately spreading; the corolla tube for the upper one third densely covered on the inside with long hairs; stamens with short glabrous filaments attached below the hairy portion of the tube; anthers at least 1 cm long, very linear, subbasifixed, also glabrous; ovary imbedded in the calyx; style glabrous, one third as long as the corolla tube, obscurely divided toward the base, bifid at the apex.

Type specimen number 21978, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

This species inhabits hot and dry river embankments at 3500 feet altitude more or less.—Recognized from *Mussaenda philippica Rich.* by its smaller leaves, much longer or setaceous calyx segments with its bracteoles and by other minor distinguishing characters.

7 **Ophiorrhiza bicolor Elm. n. sp.**

Loose or scattering perennial tufts; stems several, very unequal, the larger ones 3 dm long, sparingly branched, terete, herbaceous or suffrutescent toward the base, branches and smaller stems more or less yellowish brown pubescent or puberulent. Leaves opposite, the younger ones often with a faint reddish tinge, widely scattered, the pairs quite unequal in size, thinly membranous, entire, the largest blades 3 by 10 cm and then narrowly oblong to broadly lanceolate, most leaves however smaller and lanceolate, sometimes ovately oblong or linearly lanceolate, apex gradually acuminate, base attenuate to narrowly acute or obtuse in short and broader leaves, glabrous on both sides, much paler green beneath in the fresh specimens, light colored when dry; midrib dark brown, rather stout and pulverulent beneath toward the base; nerves 7 to 9 on each side, oblique, ascendingly curved especially toward their ends, quite faint, cross bars obscure, reticulations not visible; petioles from 3 mm to nearly 3 cm in length, brown scurfy beneath, ultimately glabrate; the interaxillary bracts deciduous, similar in vestiture, usually with two or three laciniate segments. Inflorescence 2 to 4 cm long, terminal, erect, brown puberulent, short branched toward the top only, the peduncle rather slender and more densely puberulent than the short branches; lower or longer branchlets subtended by linear bracteoles, 5 to 8 mm long, the ultimate branchlets scorpioidly recurved and somewhat compressed; flowers more or less crowded along the upper side of the branchlets, subsessile, subtended by minute bracteoles, 1 cm in length; calyx obscurely ovoid, 2 mm long, minutely puberulent on the outside, terminated by 5 apiculate teeth; corolla broadly tubular, subglabrous, 5-ridged toward the apex, the apical one third finally divided into 5 oblong segments whose dorsal side is provided with a subhyaline crest whose tips are strongly inwardly curved over the distal ends of the segments; stamens 5, included in the basal half of the tube, the short filaments inserted upon the basal portion of the tube; anthers linear, 2 mm long, bifid at both ends, basifixed; style glabrous, equalling the stamens, terminated by two compressed stigmatic lobes.

Type specimen number 21958, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected this form or species with *Ophiorrhiza zambalensis Elm.* in wet humus covered ground along shaded stream beds.—As to our Philippine species it is quite similar to *Ophiorrhiza lancilimba Merr.*, but our leaves are whitish beneath when dry and without the foliaceous bracts; its more congested inflorescence is upon a longer peduncle. Possibly it is nearest to *Ophiorrhiza oblongifolia C. DC.*, but our flowers do not seem to agree, and its leaves would hardly be called "oblong."

7

Ophiorrhiza zambalensis Elm. n. sp.

Loosely tufted biennial herbs or the terete basal portion of the stem suffrutescent; otherwise more or less crooked, 2 to 4 dm high, only sparingly rebranched, the branchlets yellowish brown puberulent. Leaves in few opposite pairs, scattered, the upper ones longer, thinly membranous, glabrous, nearly flat and horizontally spreading, entire, shining and darker green on the upper surface, when dry blackish brown, the lower side distinctly yellowish in color, not whitish nor reddish tinged, ovately oblong or the smaller laminae oblong, the pairs usually unequal in size, apex mainly acute, base acute or subcuneate to subtruncately rounded, often a trifle inequilateral toward the petiole, the larger blades 10 cm long by one half as wide below the middle, the smaller ones widest across the middle; midrib conspicuous, dark brown beneath and minutely puberulent or glabrate with age; lateral nerves 7 to 10 on each side, very evident and similar in color, divaricate from the midrib, their faint tips strongly curved ascendingly, reticulations obscure; petiole 5 to 15 mm long, the lower and basal portion finely furfuraceous, blackish brown on the dried specimens; interaxillary bracts laciniately divided, falling early. Inflorescence terminal, often subtended by foliaceous bracts, 2 to 3 cm long and wide, cymose or subscorpioidly rebranched; the short peduncle minutely furfuraceous puberulent, its branches also short and widely spreading, the subcompressed ultimate ones with relatively few scattered flowers along the upper side but especially toward the ends; flowers erect, upon the 2 mm long brown puberulent pedicels which are often subtended by minute bracteoles; calyx ellipsoid, about as long or a trifle longer with its 5 apiculate teeth, similar in vestiture; corolla nearly white, 1 cm long, the basal half tubular, the upper half becoming divided into 5 broadly lanceolate segments, minutely ciliate on the outside, its throat villous; stamens 5, included, glabrous, 2.5 mm long, the 1.5 mm long filaments inserted upon the basal portion of the corolla tube, the oblong basifixed anthers equalling the corolla throat; the gabrate style bearing two minutely ciliate and flattened stigmatic lobes.

Type specimen number 22043, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Upon wet humus covered ground along shaded stream beds at 4000 feet above sea level.—Characterized from *Ophiorrhiza oblongifolia C. DC.* by its broader ovately oblong leaves which are yellowish brown, not grayish green beneath when dry, and by other minor characters. It is more distantly related to *Ophiorrhiza ovata Merr.* Can it possibly be *Ophiorrhiza elmeri Merr.* from Borneo?

7 **Rubia philippinensis Elm. n. sp.**

A rambling and low climbing perennial herb; stems several, fragile, long and slender, repeatedly branched and rebranched, forming a tangled and diffused mass, glabrous, pale green, angular or slightly winged, the winged edges here and there provided with short recurved prickles specially along the lower side; branches nearly at right angles, otherwise similar to the stems, opposite or in a whorl with the leaves. Leaves opposite or in subwhorls, well scattered along all branches and stems, quite unequal in size, the sides with few minute prickles or nearly smooth, a trifle paler green beneath even in the dry state, glabrous, membranous, base truncately rounded, not cordate, gradually tapering from near the base to the slender acuminate apex, our largest lamina, 6 cm long and 1.5 cm wide across the base, the average ones 1 by 4 cm, triangularly lanceolate or narrowly ovate for the smallest ones, the entire edges sparsely provided with apiculae; midrib relatively conspicuous beneath and with small recurved prickles, in the larger blades with 1 or 2 rather faint lateral nerves on each side, cross bars or reticulations none; petioles very variable in length, from 1 to 7 cm long on the same specimen, divaricately spreading, slender, easily breaking, green as the blades, fluted, the lower ridges beset with recurved small spines or prickles. Inflorescent cymes scattered along and arising from the upper leaf axils, equalling the foliage or longer, divaricately rebranched from above the middle, ascending or erect, the fluted edges mainly smooth or without prickles, sparingly rebranched, all the branches subtended by glabrous and laciniate bracts, the short uppermost branchlets subtended by minute bracteoles; pedicels 1 to 3 mm long; ovary short ellipsoid, glabrate, subconstricted at the base or at the pedicel end, apex truncate, apparently without segments; corolla broadly campanulate, 4 or 5-segmented, early falling as a whole since the basal half keeps united into a broad tube, the broadly oblong segments strongly recurved; stamens alternating, also glabrous, the filaments inserted upon the corolla tube, the small anther exceeding the throat; ovary top smooth and wheel-like; styles short and divergent toward the top, each terminated by a knob-like stigma.

Type specimen number 22216, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Untangled this species from a dense mass among thickets of moist ledges along the river at 3500 feet elevation.—All our Philippine collections have hitherto been placed under *Rubia cordifolia Linn.* But the leaves of our specimen, including some of those from other Philippine collections, are not truly "cordate" as they are in many of the variable Chinese, Javan and Formosan specimens. Some of these foreign specimens suggest the genus *Galium* rather than *Rubia.*

Williamsia viridescens Elm. n. sp.

An erect shrub or a little slender tree; wood moderately hard, white, the old bark gray and brown mottled; branches lax, divaricately rebranched; the branchlets smooth, greenish and breaking with a snap, glabrous or the younger portions thinly strigose. Leaves opposite, scattered, sublucid but paler beneath, viridescent on both sides when dry, glabrous except the midrib and nerves beneath, linear lanceolate or the larger ones broadly so, gradually extended into the setaceously pointed apex, base mostly obtuse, entire, the much recurved tips often curved to one side, most of the blades 2 by 8 cm but there are smaller ones and the larger ones measure 3 by 10 cm; midrib yellowish gray and more or less strigose beneath only, with 5 to 8 fine ascendingly curved lateral nerves on each side and which are also finely strigose on the nether side; reticulations small, obscure; petioles very slender, 1 cm long more or less, with pale appressed hairs; bud bract a little shorter, laciniate, appressed pubescent, caducous. Flowers few to several in the leaf axils, subtended by minutely ciliately-fringed bracts; calyx cup distinctly stipitate, broader than long, glabrate except the slightly ciliate edges of the rim or of the short and broad teeth; corolla segments 5, light colored, tubular at the base, adnate, quite thick and glabrous on the back, erect and well incasing the stamens, the segments triangularly oblong and 3 mm in length, the nearly closed or subconstricted throat with long silvery hairs; stamens as many or more numerous, alternating with the lobes and inserted upon the throat, included, about 2 mm long, glabrous, the basifixed and oblong anther half as long and terminated in a mucronate point; pistillode present; female flowers solitary or only a few in the axils of the leaves, upon a short but thickened pubescent base; calyx obscurely 5-toothed, upon a slender stipe which at its base is subtended by a whorl of setaceous pubescent bracteoles, the calyx cup sparsely hairy on the outside toward the top and on the inner surface of the rim; petals similar to those of the male flower; ovary glabrous and wheel-like at the top, deeply imbedded in the calyx; style gradually thickened to the clavate stigma, entirely glabrous; staminodes 5 or more, apparently all sterile.

Type specimen numbers 22078 for the pistillate and 22046 for the staminate flowers, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in a deeply cut densely wooded ravine and upon steep wooded ledges at 3500 feet.—Near to *Williamsia everettii* (*Merr.*) *Merr.*, but our pistillate flowers are distinct and with a different indumentum. Our leaves are also thinner and remaining greenish in color.

RUTACEAE

7 **Evodia zambalensis Elm. n. sp.**

A little slender rather graceful tree; wood soft, bark smooth and mottled; main branches rather freely rebranched toward the ends; twigs terete, erect or ascending, glabrous on the green tips which when dry are nearly black. Foliage ample, opposite, similarly disposed, folded upon the upper darker green smooth surface, curing light brown beneath, entire, entirely glabrous, trifoliate, narrowly oblong or broadly oblanceolate, base cuneate, apex obtuse to acute, tips not retuse, most of the blades turning nearly black on the upper side, the larger lamina 3.25 cm wide, 1 dm long, smaller ones interpersed, the lateral leaflets a trifle inequilateral at the base; midrib brown or gray, raised beneath; lateral nerves divaricate, obscure, 9 to 12 on each half, reticulations visible beneath and minutely black punctate; petiole up to 5 cm in length, sometimes only 1 cm long and bearing a single leaflet, smooth, strict, glabrous, murinous when dry; petiolule 5 mm long or shorter. Inflorescence axillary, erect or ascending, about equalling the foliage, 1 dm long, as wide across the corymbose top, branched from the middle, the secondary branches from above the middle, flower-clustered toward the ends of the ultimate branches, all the branching opposite, the upper short ones subtended by persistent bunt tooth-like bracts; pedicels 3 to 5 mm long, straight but divaricately spreading, crowded, the ultimate ones chiefly 3-clustered, subtended by apiculate bracts; calyx segments united at the base, 4, glabrous, rather thick, subequal in size, ovately rotund, persistent; petals white, alternating with the calyx segments and inserted separately upon them at the ventral base, also glabrous but glandular above the middle, oblong, obtuse at apex, subclawed at the base, up to 4 mm in length, recurved, deciduous; stamens suberect, 1 cm long, opposite the calyx segments, glabrous, gradually tapering from the flattened base to the sharp apical point; anthers 2 mm long, oblong, versatile, dorsifixed, basal portion lobed, apical point blunt; ovary roundly 4-lobed, inserted upon a thickened or fleshy base; style stout, shorter than the filaments, likewise glabrous, terminated by a small sessile stigma.

Type specimen number 22326, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in wooded fringes along the meadows at 4000 feet elevation.—This species can easily be recognized from *Evodia benguetensis Elm.* by its different foliage and inflorescence.

STAPHYLEACEAE

7 **Turpinia sambucifolia Elm. n. sp.**

A rather large and widely spreading tree; trunk 6 to 9 dm thick, crooked; the wood soft and whitish, covered with gray bark; main branches crookedly rebranched, the ultimate ones rather thick; twigs erect or ascending, terete, glabrous, the broadly lanceolate bud bracts likewise glabrous. Leaves opposite, decompound, ascending or horizontally and widely spreading, 2 to 3 dm long on my specimens but mostly larger, its branches chiefly opposite, coriaceous or chartaceous; the upper surface of the leaflets usually folded on the upper shining and deeper green surface, curing unequally dull or blackish brown on its two sides, oblong or subelliptic in shape, apex acute to sharply acuminate, base obtuse or obtusely rounded, the old or larger leaflets 5 by 10 cm, frequently smaller and narrower, pari-or imparipinnate, 9-foliate, opposite and well scattered along the slender terete rachis, crenately serrate along the margins except at the basal portion; primary petiole up to 5 cm in length, the secondary petiole 3 cm long, all glabrous; petiolule 5 mm long except the terminal one which is three times as long; midrib raised beneath, slender, with 5 to 8 faint ascendingly curved lateral nerves on each side, cross bars or reticulations scarcely visible from beneath, more evident from the upper side in the dry condition. Infrutescence terminal or divaricately spreading, equalling or exceeding the foliage, paniculate, the stalks pale green but blackish brown when dry; peduncle about one third the length, the branchlets scattered and usually opposite, the ultimate ones short and nearly at right angles. Fruits very dark green when fresh, much greener than the stalks, murinous when dry, globose or nearly so, 1.5 cm in diameter, glabrous, short pedicelled, at the base usually marked by the calyx scar, the smooth surface frequently marked by greenish brown zones or zonal old portions.

Type specimen number 22178, *A. D. E. Elmer,* Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in light woods of open grass regions along the horse trail at about 3000 feet altitude.—Its affinity is with *Turpinia pomifera (Roxb.) C. DC.*, but our leaves are smaller, oblong to narrowly elliptic in shape, thinner in texture, regularly and crenately serrate from near the base to the sharply acuminate apex. It is not *Turpinia ovalifolia Elm.* which is quite distinct from *Turpinia pomifera (Roxb.) C. DC.*

ULMACEAE

Trema philippinensis Elm. n. sp.

A small and suberect tree; stem crooked, widely branched, the main branches ultimately numerously rebranched; twigs erect or ascending, soft in texture, densely canescent or toward the tips provided with long silky white hairs; the bud bracts varying from 5 to 15 mm in length, unequal, few to several, edges often involute and the longer bracts twisted toward the apex, silvery white hairy on the outside. Leaves profuse, easily breaking in the dry state, horizontal or descending, the younger ones ascending, gradually tapering from the middle to the slenderly acuminate apex, base subequally rounded, sometimes a trifle cordate, the larger blades 3.25 cm wide, three times as long, ovately lanceolate to broadly lanceolate of the smaller ones, margins usually finely crenate; petioles 5 to 8 mm long, densely white hairy; blades much darker or duller green on the upper surface, curing much lighter green beneath, upper side subscabrid, minutely tubercled, sunken along the midrib, nerves, and even along the reticulations, only the midrib sparsely hairy along the upper side; nerve 3 or 4 on each side, grayish white hairy, much ascending, the basal pair with secondary lateral nerves, the reticulations prominent, finely ciliate and otherwise the areolae more or less minutely scurfy. Cymes axillary, clustered, less than 1 cm across, all the branches finely ciliate pubescent; flowers severally-clustered or glomerate; the male sessile or very short pedicelled, globose, subtended by 2 or 3 small unequal bracts which are minutely ciliate on the back; perianth segments 5, deeply concave, broadly oblong to subelliptic, overlapping one another, 1.25 mm long, minutely ciliate along the edges, otherwise glabrous, subunited at the base; stamens 4 or 5, equalling the segments and included, the short relatively thick filaments scarcely longer than the rotund anthers, glabrous, separately inserted on the perianth; anthers bilobed at the base, basifixed, less than 1 mm in length; pistilode clavate, densely hairy around its base; perianth segments of the female flower with a short claw at the base, apex obtuse, 1.25 mm long, more widely spreading than in the male flowers, also ciliate along the margins. Dry berry 3 mm long, subglobose to ovately oblong in outline, glabrous, green, red to nearly black when mature.

Type specimen number 22227, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered from dry and warm creek banks of open places at 4000 feet altitude.—A critical alliance with *Trema vulcanica Merr.* which is not listed in his Enumeration of Philippine Plants. Our leaves are twice as large, have a different shape, and our indumentum is also distinct.

URTICACEAE

Elatostema brunneolum Elm. n. sp.

A rank, tufted and succulent herb; stems few-clustered, the larger ones at the base nearly 2.50 cm thick, watery green, ascending or reclining and occasionally branched, longitudinally fluted; the leaf bearing portion suberect, with smaller ridges, more or less with dirty brown scales and spinulose hairs. Leaves distichous toward the ends of the stems or branches, nearly flat but tips recurved, 3 to 5 on each side, soft succulent and much paler green beneath, the basal half gradually narrowed, when dry membranous and unequally brunneous on its two sides, inequilateral, the terminal ones somewhat larger, the average blades 6 by 16 cm, widest across the middle or just above it, the upper margin below the middle nearly straight, the lower edge of the blade curved and also entire toward the unequally obtusely rounded base whose lower portion is subauriculate, otherwise the edges on both halves coarsely dentate especially toward the sharply acuminate apex, the normal lamina 2.5 cm wide across the narrower or upper half, 3.5 cm wide across the broader or lower half of the leaf, the upper dry leaf surface densely covered with yellowish gray to whitish linear cystoliths which are scarcely visible on the lower side; midrib somewhat curved with a prominent basal pair of nerves running submarginally to above the middle of the blade, with 3 or 4 secondary nerves in the upper half, reticulations coarse, all more or less sprinkled with spiculate hairs; petioles very short and stout, the lower side especially densely spiculate; bud bracts up to 2 cm in length, oblong to lanceolate, conduplicate, erect, glabrous, very thin and light brown when dry, fugacious. Male and female flowers in separate heads or glomerules and upon separate stems or stalks, in the leaf axils of the fallen leaves, erect and crowded over the reclining stems; the staminate flowers whitish and in much enlarged involucral cups; the sessile female heads grayish white; female involucral bracts transparent, unequal, 3 to 4 mm long, their bases overlapping, erect, broad at the base, apex acuminate or setaceous, long ciliate on their backs and at their tips; florets crowded, equalling or shorter than the involucral bracts; pistils minute, short stipitate, ovary compressed and glabrous, stigma of two long transparently white appendages, subtended by numerous long slenderly ciliate white hairs; staminate clusters 2 cm wide, nearly as high or long, upon a very short stalk; outer perianth segments grown into a nearly glabrous cup, pale green in the fresh state, distinctly short veined, irregular or subtruncate across the inwardly curved top; the inner involucral bracts hyaline, very unequal in size and shape, glabrous, free but imbricate, equalling or shorter than the outer ones; stamens 3 mm long, the subelliptic anther longer than its stipe, basifixed at the obtuse base, apiculate at the apex.

Type specimen number 22102, *A. D. E. Elmer,* Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered in wet humus covered stream banks of densely shaded woods at 3750 feet elevation more or less.—Our specimens are different from *Elatostema banahaense C. B. Rob.*, but seem to fall in the group with *Elatostema spinulosum Elm.*

7 **Pipturus subalpinus Elm.** n. sp.

A rambling and scandent shrub; its tangled branches rebranched, lax, the branchlets glabrous and reddish brown even in the fresh state; ultimate twigs rather slender and flexible, erect or suberect, greenish when fresh, dull brown when dry, sparsely pubescent. Leaves copious, alternate, sublucid above, paler green beneath, both sides curing similarly brownish black, entire, thickly coriaceous, oblong or subelliptic, apex obtuse or sharply acute or even acuminate, base acute even on the smallest blades which are broadly elliptic to subrotund and whose apices are rounded or obtusely rounded, laminae up to 8 cm in length by 3 cm in width across the middle but more often smaller, the lower surface covered with a lighter colored scurf, the upper side densely and minutely yellowish gray glandular; midrib slender, with a pair of basal nerves from the base and which extend almost to the apex, usually with one or two secondary nerves from above the middle and which also extend into the apex, all darker colored in the dry state, glabrate or sparsely strigose, the cross bars and reticulations obscure; petiole slender, 1 cm long, sparsely hairy and becoming glabrate. Male inflorescence profuse, ascending to horizontal or descending, the slender stalks from a few to 9 cm in length, arising from the leaf axils or from below the foliage, usually curved, occasionally short branched, nearly glabrous or the young portions strigulose; flowers more yellow than green when fresh, well scattered in dense heads or glomerules, more or less pubescent on the exposed portions, 5 to 8 mm across when dry, subglobose and sessile or nearly so; perianth segments 4, nearly equal, free or adnate at the broad base, triangularly ovate, apex obtuse to subacute, with prominent midrib, convex, their tips strongly curved over the top of the flower, 1.5

mm long; stamens 4, opposite the segments and enclosed by them, glabrous, the filaments very short; the anthers introrse, curved, attached from the thickened dorsal connective, bilobed at the base, emarginate at the apical end; pistillode erect, also glabrous, subclavate.

Type specimen number 22016, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

I collected this plant in very wet and densely wooded ravines at 3500 feet elevation.—Our leaves are much smaller, entirely glabrous, with shorter and thinner petioles than the Malayan *Pipturus repandus* (*Blm.*) *Wedd.* to which our Philippine low hill specimens belong.

VERBENACEAE

Callicarpa magna lilacina Elm. n. var.

Tree with a 3 dm thick trunk, its whitish wood not hard; branches few, crookedly rebranched; twigs ascending, distinctly angular, squarrose, 1 cm thick, densely covered with a yellowish brown or sordid ciliated scales or lanate in appearance, few but widely scattered. Leaves opposite, 5 to 8 cm apart, yellowish green beneath in the fresh state, yellowish brown in the dry state, chiefly horizontal, nearly flat but tips recurved, smaller lamina broadly ovate, the normal blades subtriangular in outline, the larger blades 12 by 18 cm, gradually extended from the base into the sharply extended apex, the smaller ones merely acute, base broadly obtuse in the smaller ones, truncate in the larger ones but with rounded basal halves, entire, submembranous or chartaceous, completely covered on both sides in the young stage with light yellowish gray colored minutely ciliated scales, those on the upper surface disappearing with age except along the midrib toward the base; midrib stout, raised beneath, glabrous on the upper surface when old except along the lower half; nerves 6 to 9 on each side, ascending, a few pairs crowded from near the base, tips much ascendingly curved, glabrous on the upper surface in the old leaves, cross bars conspicuous, reticulations evident on the nether surface; petioles thick, 3 to 6 cm in length, dirty brown lepidote, flatly grooved along the upper side. Inflorescence terminal, suberect, paniculate, often the lower portion arising from the uppermost leaf axils, varying from 1 to 2 or even 3 dm in length, only half as wide, all the branches more or less angular, covered with a reddish brown or a ground colored tomentum; the larger branches frequently subtended by leaf bracts, cymosely rebranched, subtended by linear strongly involute pubescent bracts; the ultimate branchlets short and somewhat crowded, densely lanose; flowers rarely single, usually 3-custered or in glomerules, sessile or subsessile, subtended by small tooth-like bracteoles which are densely ciliate; calyx cup-shaped or turbinate, glabrate, 2 mm long with truncate apex or obscurely 4-apiculate; corolla also glabrous, deep blue or lilac, 4 mm long, the lower half thick tubular, the upper portion divided into 5 oblongish segments whose apices are obtusely rounded, inserted upon the base of the calyx; stamens 4, the slender and much crooked or looped filaments attached separately upon the corolla tube, glabrous; anthers oblong, 1.75 mm long, emarginate at the apex, bilobed at the base, basifixed, usually adnate in pairs; style similar to the filaments but exceeding them, terminated by a flattened stigma; the short ovoid ovary gland covered.

Type specimen number 22377, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Discovered this rare tree in a dense very damp wooded flat at about 4000 feet elevation.—Typical *Callicarpa magna Schau.* is not common, and is more or less restricted to the low hill country bordering east Laguna bay in which region the writer collected it several times. Similar specimens from Palawan and Mindanao do not match. Our variety is primarily recognized by its triangularly shaped, not ovately rounded leaves, and by the crowded nerves from the basal portion of the leaf blades.

Clerodendron philippinense Elm. n. sp.

Lax shrub or tree-like; wood soft, white, covered with tubercled earth-colored bark; main branches few, occasionally rebranched; twigs or branchlets angular or squarrose, ascending, densely covered with a rubiginous pubescence, soft or weak in texture, rather thin. Leaves opposite, widely scattered, few, horizontally spreading, much paler beneath, mostly flat except the recurved tips, curing unequally brown, membranous, entire, the base broadly or truncately rounded, gradually tapering into a sharply acuminate apex, the larger lamina 1 by 1.5 dm, ovate, rather densely pubescent and apparently minutely glandular or both sides; petioles 5 to 8 cm long, those of the smallest leaves only 2 cm in length, herbaceous, densely covered with soft and dark, not yellowish gray, ferruginous hairs, often the opposite pairs unequal in length; midrib conspicuous on both sides and more densely pubescent; nerves ascending, their tips faint and ascendingly curved, from near the base a minor and major pair, from 5 to 8 on each half, cross bars quite evident on the lower side, all more or less densely covered with dark reddish brown hairs. Inflorescence terminal, erect or ascending, frequently subtended by a reduced leaf or leaf-like bract, cymosely paniculate, sometimes upon a slender peduncle to the first branches, 1.5 dm long, usually wider than long, all branches more or less slender and similarly pubescent, widely spreading or divaricate, twice rebranched from above the middle, usually the main branches subtended by a pair of foliaceous bracts, the secondary branches similarly rebranched and subtended by broadly lanceolate bracts; flowers erect or nearly so, usually 3-clustered from the ends of the ultimate branchlets, subtended by lanceolate bracts 1 cm in length; lateral flowers upon very slender more or less pubescent 5 mm long pedicels, the middle flower upon relatively thick 2 mm long pedicels; calyx 1 to 1.25 cm long, pubescent, turbinate, the upper half divided into 5 linear to lanceolate calyx segments; corolla 2 to 3 cm long, the slender tube ciliate; corolla segments as many as calyx teeth, narrowly oblong, rounded at the apex, 1 cm long or longer, glabrous or minutely strigose on their dorsal basal portion, white; stamens glabrous, exerted, the slenderly recurved filaments somewhat compressed and inserted upon the corolla throat; anthers oblong, 2.5 mm long, bilobed at the base; style equalling the stamens, terminated by two sharply pointed stigmatic lobes; ovary glabrous, imbedded at the base of the calyx cup.

Type specimen number 22379, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Collected in humid woods at 3000 feet above sea level.—Its nearest alliance is with *Clerodendron vanoverberghii Merr.*, but our indumentum is darker reddish brown, inflorescence differently shaped, calyx teeth much longer and linearly lanceolate, also longer corolla tubes and with larger corolla segments.

ZINGIBERACEAE

7 **Languas pinatubensis Elm. n. sp.**

Spreading terrestrial clumps; stems comparatively few, ascending, 2 to 3 m long, 1.25 cm thick, green, swollen at the base, the lower one third leafless; rhizomes short, yellowish white. Leaves alternating and mainly in two rows, the lower ones widely scattering and much reduced, more crowded and narrower toward the top, the upper ones ascending, the lower and broader ones descending, the middle and normal blades horizontal, 9 cm by 4 dm in size, paler beneath both in the fresh and dry states, entire, subchartaceous or thinly membranous when cured, base broadly obtuse to rounded, flatly conduplicate on the upper glabrous surface, apex abruptly extended into setaceous twisting and pubescent recurved point; midrib very strong and soft pubescent beneath, deeply caniculate on the upper side below the middle and especially so toward the petiole; veins or nerves very fine, strictly oblique, numerous, parallel; sheaths finely ridged, puberulent toward the base on the outside, densely pubescent toward the ligule, the central ciliate edges purplish brown and becoming separated from the stem; ligule rigid, 1.25 cm long, erect, broadly rounded and ciliate at the top, canescent on the exterior, glabrous and purplish brown on the inner face; petiole 2 cm long more or less, stout, canescent, channelled along the upper side. Infrutescence terminal, 2 to 3 dm in length, in the flowering state pubescent, becoming subglabrous when old except the ultimate branches and their pedicels, the main stalk or rachis green, with few alternating branchlets, subterete, puberulent, the branchlets not very long and ascendingly curved toward their ends; the secondary rachis subangular, bearing fruits from near the base, finely pubescent, thick at the base but thin at its distal end; fruits alternatingly crowded, the terminal ones single and upon very short pedicels, the lower ones 2 or 3 from a common 1 cm long stalk, elliptically globose, smooth and shining, 8 mm in diameter, hard, green, then yellow, finally dark or wine red, brown and strongly wrinkled when dry.

Type specimen number 22058, *A. D. E. Elmer*, Mt. Pinatubo, Zambales Mountains, Province of Pampanga, Luzon, May 1927.

Gathered in wet ground along creek beds well shaded with trees and undershrubs at 4000 feet above sea level.—From the type of *Languas flabellata* (*Ridl.*) *Merr.* it is primarily distinguished by its much broader leaves whose apices are setaceous and strongly twisted, and by its pubescent sheaths and petioles.

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LEAFLETS OF PHILIPPINE BOTANY

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NEW URTICACEAE AND RUBIACEAE

by

A. D. E. ELMER

URTICACEAE

Elatostema bulusanense Elm. n. sp.

Succulent herbs. Stems up to a meter in length, usually few clustered, erect but spreading toward the top, the larger ones few-branched from above the middle, angularly terete or straight fluted, watery green, 2.5 cm thick, the branches ascendingly spreading and leaf bearing toward the slender glabrous tips. Leaves in two alternating ranks, coriaceous, horizontal, flat and recurved at the sharply acuminate tips, paler beneath, curing unequally green on the upper and lower sides, thinly membranous when dry, subsessile or upon very short petioles, inequilateral especially toward the subcuneate base, wholly glabrous, oblong, the larger lamina 5 cm wide across the middle and 2 dm in length, the lower ones usually broader for their length, the upper edge entire except for the few apiculate teeth toward the slenderly pointed apex, also entire below the middle of the lower curved edge, otherwise coarsely serrate, cystoliths more conspicuous on the upper surface; midrib pronounced and reddish brown beneath, slightly curved; basal nerve arising from near the base of the blade and extending to above the middle, the upper nerve arising 1 to 2 cm above the lower nerve and running parallel with the edge to above the middle of the blade, the several reddish brown secondary nerves coarsely reticulated and united at their tips; bud bracts linearly oblong, 2 cm long or some shorter, conduplicate, the middle portion spotted

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and streaked with reddish brown, sides hyaline, glabrous. Male flowers in dense axillary 1.5 to 2 cm thick heads, upon short erect stalks, the cup pale green, the florets watery white; the dense and sessile female heads smaller in size, dark green and usually from the lower leaf axils or from their scars; the outer bracteoles of the male cup 1.5 cm long, broad and irregular across the top, glabrous but streaked or spotted with reddish brown, the inner ones thinner and narrower, cuneately tapering toward the base, imbricate, similarly pigmented; florets surrounded by numerous linear bracteoles about 5 mm long, upon short stipes, its segmented perianth very thin and hyaline, not reddish brown tinted; the anthers included and subsessilely inserted upon the basal portion of the perianth; female cup bracts fewer and irregular in size, subhyaline except the greenish tips, not reddish brown spotted or streaked; inner bracteoles very numerous, all thinly hyaline, linear to narrowly oblanceolate, bearing long ciliate hairs toward the apex; ovary minute, oblanceoloid, short stipitate, terminated with a brush of long ciliate and hyaline hairs.

Type specimen numbers 16172, 15575 and 16399, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, December 1915 to June 1916.

Collected in wet humus covered rich ground of flats in the Manila-hemp fields and in wet earth among boulders near stream beds of a deeply shaded gulch at 2250 feet altitude.—Resembling *Elatostema banahaense C. B. Rob.* and *Elatostema edule* of the same author.

Elatostema glabratum Elm. n. sp.

Dense mats. Stems short, branched, creeping or decumbent, forming more or less tufts, finally ascending. Leaves pale green but especially so on the nether side, in the dry condition unequally earthy brown on its two sides, glabrate, the short cystoliths more evident on the upper surface and appearing imbedded beneath, arcuate and inequilateral, 1.5 cm wide by 3 cm long, the larger ones twice as long and 2 cm wide across the middle, oblong, subsessile, acute to subacuminate, coarsely serrate except toward the subcuneate base which is obtusely rounded on the lower broad half of the lamina, the upper edge straight and entire up to the middle of the blade; midrib curved, darker brown on the dry specimens, usually provided with few short hairs on the lower side toward the base; the lower nerve arising a few mm above the base of the lamina and extending half way up the blade, the upper nerve arising a few mm above the lower one and extending for about the same distance; secondary nerves faint as are the pair of the lateral ones, oblique, 3 to 5 from above the middle, usually forked toward their ends, reticulations none or very obscure; bud bracts 5 to 8 mm in length, linear, hyaline margined, the dorsal middle portion often puberulent. Female inflorescence in dense axillary clusters, frequently subtended by short thin fugacious bracts; receptacle flat, fleshy, 1 cm across but only half as wide in the dry state, its margins irregular, glabrous, upon a very short stalk; florets numerous and densely crowded, surrounded by very linear bracteoles; these are soft and transparent, averaging 2 mm long, minutely ciliate toward their ends; most of the florets are sterile and are represented by slender stipes; the fertile florets are subsessile, surrounded by a perianth whorl whose transparent segments are clavate in shape and bear a fringe of fine hairs at their ends; seeds or achenes light brown, shorter than the bracteoles and its own perianth segments, short stipitate, narrowly ovoid, apex pointed, base rounded.

Type specimen numbers 16325 and 15576, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June to August 1916.

Gathered on wet rocks or upon ledges thinly covered with earth along a creek bed of a deep densely shaded gulch at about 1500 feet elevation.—It often happens that the color plants retain in the dry state gives the casual observer a clue as to the group of plants to which they belong, or suggests a difference in species of the same genus. Compare our specimens with those of *Elatostema philippinense Elm.*

Elatostema maquilingense Elm. n. sp.

Dense tufts forming masses. Stems many from the same cluster of fibrous roots, varying from 3 to 10 cm in length, filiform in the dry state, ascending or nearly prostrate and spreading in all directions, curing dull brown, sparsely short ciliate along the upper side toward the base, crisply ciliate toward the distal end, leaflet bearing from near the base, sometimes branched or interlaced from near the ground. Leaves alternate, arranged in two opposite rows, membranous, flat, horizontal or ascending, curing much lighter green beneath, the larger lamina 4 mm by 10 mm but often smaller especially those toward the base which are relatively broad for their length, inequilateral, sessile, slightly arcuate, the upper edge nearly straight and with 2 or 3 teeth toward the apex, the lower edge or margin concave and with 3 to 4 serrate teeth toward the apex, otherwise entire, both ends obtuse, the lower end obliquely so, the basal portion of the lower half of the blade rounded or not quite auriculate, oblong in outline, glabrous but with cystoliths on both sides; midrib raised beneath, depressed above, slightly curved, provided with parallel cystoliths upon the upper surface; the upper and lower nerves arising from near the base of the lamina and almost opposite each other, extending up to the first teeth; the secondary nerves 1 to 3 on each half, obscure, arising from and above the middle, their ends usually forked, reticulations not evident; stipules very small, fugacious, glabrate. Inflorescence axillary, erect, 1 to 3 mm across, fully as high; involucral segments widely spreading, soft in texture, thin, their basal portion united and forming the receptable, linear, the midrib portion green, the margins hyaline, unequal in size or length, beset with white setose hairs; female florets not very numerous in a head, surrounded by a perianth-like whorl, its several segments transparent and greenish toward their ends or apices, shorter than the involucral bracts, very finely ciliate towards their distal ends; ovary subsessile, with a brush of cilia at its apex; achenes distinctly stipitate, compressed, ellipsoid, brown, 1 mm long, at the base subtended by a collar of short or minute bract vestiges and without cilia.

Type specimen numbers 17636 and 18361, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Found growing in densely shaded humid woods upon boulders covered with shallow earth at medium altitudes.—Intermediate between *Elatostema microphylla Elm.* and *Elatostema oblanceolatum C. B. Rob.*, but nearest to *Robinson's* species, from which it is primarily distinguished by its different leaf cut and by its more numerous prominent teeth.

Elatostema pacificum Elm. n. sp.

Dense mats. Stems creeping and rebranched, matting upon the ground, the leaf bearing portion ascendingly curved, very slender, glabrous but marked with cystoliths, in length varying from 5 cm to 3 dm long, much curved toward their bases. Leaves well scattered, alternate, mainly in two rows, quite membranous, curing unequally green on its two sides, arcuately oblong, greatly varying in size, the basal or much reduced ones obovate in outline, the apical pair usually the largest, wholly glabrous, subsessile, the upper surface crowded with conspicuous cystoliths, the lower surface without them, 1 to 1.5 cm wide across the middle, up to 3 cm in length but the majority of them shorter, the smallest blades only 5 mm long and nearly as wide across the apical portion, their bases cuneate, all flat and horizontally spreading, apex of the normal lamina sharply acute to slenderly acuminate, base subcuneate to obliquely rounded, only the basal portion entire along both edges, sharply serrate from near the base, the upper serratures quite prominent, even the apical portion serrately dentate; midrib darker green beneath, slightly curved, glabrous or very sparsely strigulose; the basal pair of nerves arising 1 mm apart from each other at the base of the blade and extending one third up the length of the leaf, rather faint especially toward their ends, usually with 1 to 3 secondary nerves from the middle of the leaf to its apex; stipules glabrous, ovately oblong, yellowish green, easily falling, 3 mm long. Flowers dioecious; female in flat axillary sessile clusters measuring 3 mm across; the involucre flatly spreading, subtransparent or greenish, united toward the base, divided into unequal segments which are rather sharply pointed, glabrate or very sparingly ciliate on the segments; the inner bracts surrounding the florets transparent or greenish tipped, narrowly linear, ciliate toward their ends; achene subangular and fusiform in shape, stipitate, at its base subtended by a collar of perianth vestiges; male flowers upon a 1.5 to 2 cm long thread-like ascending peduncle which arises from the leaf axils; cup twice as wide as the female cluster, 4 to 6 mm high, pale green or subhyaline, glabrous; outer cup bracts mostly united, only their tops roundly lobed, thin and minutely ciliate along their upper edges, usually corniculate; the inner bracts subtending or surrounding the relatively few florets linear to oblanceolate, with hyaline sides and terminating in a conspicuous appendage, edges not ciliate, the central ones quite small.

Type specimen numbers 16968, 14613 and 16173, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915 and March to August 1916.

Found matting the sides of large boulders along densely shaded and humid stream beds at 1500 to 2000 feet above sea level. —*Elatostema simulans C. B. Rob.*, but our sessile leaves are sharply dentate to serrate nearly to their bases, not auricle-like at their lower basal ends, and our veins beneath not setose nor pilose. Apparently more distant to *Elatostema gitingense Elm.* and *Elatostema glaucescens Wedd.*

Elatostema perlongifolium Elm. n. sp.

Loose, rank clusters. Stems several, angularly terete, 2 to 3 cm thick toward the brownish base which is usually curved and reclining, ranging from 5 to 12 dm long or high, ascendingly curved toward the leaf bearing portion, the larger ones few branched from above the middle, the upper portion pale green and glabrous. Leaves alternate, chiefly toward the ends of the twigs, the lower ones somewhat smaller and irregularly scattered, the distal ones 2 to 4 cm wide and 2 dm long, wholly glabrous and wholly entire, lanceolate or sometimes linear, their widest portion usually below the middle, nearly straight or very little arcuate, subsessile or upon a very short thick blackish brown petiole, inequilateral, both margins gradually tapering from below the middle to the very slenderly pointed apex, the lower side at the base broadly obtuse to broadly rounded and thereby forming a subauriculate base, the upper basal portion of the lamina acute and terminating 1 cm above that of the lower half of the blade, curing green, subcoriaceous, horizontally spreading or ascending, plane and apex gradually recurved, very light green beneath in the fresh plants, upper surface crowded with chalky white cystoliths which on the lower side appear imbedded; midrib nearly strict, brownish green beneath on the dry specimens, glabrous and free from cystoliths, stout and pronounced beneath; nerve on the lower half arising 5 to 8 mm above the base of the lamina, the upper nerve arising 5 mm above the base of its half of the blade, both ascending for a distance of 5 to 8 cm; the secondary nerves as faint as the basal pair of nerves, many, subdivaricate from the midrib but ascendingly arcuate toward their ends, the upper ones very short; reticulations rather coarse, quite visible with a lens; the upper leaf axils provided with erect fugacious bracts which are 2.5 cm long, strongly conduplicate, their sides thinly membranous, very pale green except the middle basal portion which is brown, glabrous. Inflorescence 1 cm across or wider, in subsessile button-shaped heads, axillary and somewhat crowded over the upper side of the stem, velvety green when fresh; plate of the receptacle thick and fleshy, the lower or outer side glabrate, more or less rugose, its irregular rim provided with variously sized and shaped segments which are submembranous, broad at the base, terminated in a recurved or twisted apex; the inner bracts very numerous, thinner in texture and smaller in size toward the center, ciliate pointed; bracts subtending or encircling the female florets 2.5 mm long, very transparent but often with greenish tips, linear to narrowly oblanceolate, long ciliate; ovary short-pedicelled, fusiform or ellipsoid, subtended by a perianth vestige, terminated by a tuftlet of 1.25 mm long hyaline hairs.

Type specimen number 16408, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June 1916.

Discovered this unmatched and very distinct *Elatostema* in wet humus covered ground of a deep forested depression at about 2250 feet altitude.

Elatostema rupicolum Elm. n. sp.

Herbaceous mats. Stems many, chiefly horizontal although the longer ones ascending, branched and interlaced at the ground, filiform in the dry state, occasionally rebranched above the middle, 3 to 5 cm or even 8 cm long, the basal portion dirty brown, dull green along the leaf bearing portion and covered with dirty white setose hairs. Leaves flat, soft membranous, horizontally spreading and in two alternating rows, well scattered along the entire length of the stems, curing a dull green on both sides, quite variable in size, the small obovate ones along the middle portion of the stem as well as from the basal portion, the largest lamina always at the ends, 5 to 15 mm long, from 4 to 9 mm wide above the middle, cuneiform for the larger and obovate for the smaller laminae, inequilateral but distinctly cuneate from the middle to the acute base, though its lower half is broader than the upper half, form of apex obliquely rounded and with a dentate tooth, relatively coarsely serrate above the middle along both edges clear around the apex, below the middle or toward the base on both sides entire, subsessile, densely marked with whitish cystoliths on the upper surface but which are not evident beneath, the lower side ciliate especially along the midrib, nerves and veins; the midrib relatively conspicuous beneath, nearly straight, terminating in the terminal tooth, densely bristly toward the base; the lateral basal nerves arising 1 mm from each other at or near the base of the lamina and extending one third to one half up the length of the blades, also bristly ciliate, less prominent than the midrib; secondary nerves faint, arcuate toward their ends, from 1 to 3 on each side of the midrib, ciliate strigose, reticulations not in evidence; stipules not seen but the bud bracts seem to be setaceous and about 3 mm in length. Female cluster small or 3 to 5 mm across, in the leaf axils and riding partially over the upper side of the stem, sessile; the flat receptacle glabrate on the exterior, not thick nor rigid, the greater length dissected into linearly pointed segments which are more or less ciliate and greenish tipped; bracts intermixed with the florets, very linear, similarly colored toward their ends, ciliate from the base up but especially toward their apices; ovary when young upon short stipes which lengthens with age, with few cilia at its apex and which soon disappear; young seeds or achenes brown, ellipsoid, subtended by a collar of bract or perianth vestiges, rather pointed at the apex, separating from the stipes which remain.

Type specimen number 18000, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Gathered from moss covered stones of a well shaded creek bed at a medium altitude.—Our leaves are only half as long as in *Elatostema brongniartianum Wedd.*, and with other minor but distinguishing characters. Neither can it be classified with *Elatostema maquilingense Elm.* nor with *Elatostema oblanceolatum C. B. Rob.*

Elatostema serratifolium Elm. n. sp.

Rare herbs forming scattered tuftlets. Stems curved and reclining at the base, fleshy, stoloniferous and reddish brown upon the ground, glabrous but sparingly setose along the leaf bearing portions, dull or dirty brown and fluted in the dry state, 5 cm to 2 dm long or longer, the larger ones ascending to suberect, simple or branched. Leaves along the terminal portion, not crowded, quite unequal in size but not in form, alternate, sessile, subcoriaceous in the field, membranous and rather unequally dull green on its two sides in the dry specimens, horizontal or the lower ones descending, linear, ranging from 1 to 7 cm long and from 4 to 8 mm wide, most of them 6 mm by 4 cm, the short basal ones obovately oblong and distinctly arcuate, the linear ones strict and not arcuate, apex acuminate, that of the much shorter lamina obtuse or even rounded, base oblique or inequilaterally obtuse, the lower half at the base rounded, the upper half at the base acute, only the basal portion entire, otherwise finely and evenly serrate on both sides clear into the apex, the upper surface glabrous but densely crowded with short cystoliths; midrib ridged and setose beneath, narrowly grooved above; nerves many, very short, at right angles to the midrib, prominent and likewise setose on the lower side, their tips more or less united and forming a submarginal line, the basal pair of nerves ascending and connecting with the tips of the short secondary nerves; reticulations fine, obscure, without setose hairs; bracts subtending the leaves or from the leaf axils diaphanous, yellowish green, oblong, glabrous but the midrib portion along the back bearing cystoliths, 3 to 5 mm long, caducous, erect. Flower clusters compressed or saucer-shaped, circular in outline, grayish green on the live plants, 5 mm across, upon a very short stalk from the leaf axils; involucral bracts united at the base, the outer ones greenish and ciliate along the edges or margins, the inner ones narrower, all acute and subcorniculate at the apex; male florets few, distinctly short stipitate, subtended by finely ciliate bracts; the 2 stamens surrounded or rather enclosed by a 5-carinate perianth, transparent except the sharp apical green points, minutely ciliate; anthers broadly ellipsoid upon very short filaments.

Type specimen number 14712, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Found in very wet humus covered ground of wooded ridges or upon stream banks or ledges at 1750 feet above sea level.—Some of this distributed material had a mixture of two distinct species. The rare or narrow leafed specimen here described and a common broad leafed specimen described below as *Elatostema sorsogonense Elm.* This is another instance where two closely related species were growing together in the field,—the broad leafed form common, the narrow leafed form rare. See 14249 or *Elatostema urdanetense Elm.*, a broad leafed form which in the field was abundant, and 13831 or *Elatostema umbrinum Elm.*, the narrow leafed form which was rare and found growing intermixed with it.

Elatostema sorsogonense Elm. n. sp.

A common herb, forming masses. Stem or stems succulent, creeping, decumbent, finally ascending, terete, dull green, the shortest 5 cm long, the longer ones 3 dm, earth colored when dry, glabrate toward the base, sparsely ciliate and loosely dull brown scurfy toward the apex, sometimes branched from the middle or above it. Leaves in two alternating ranks, membranous or thinly coriaceous, darker green above, chiefly horizontal or ascending toward the top, the largest blades mainly crowded toward the ends of the stems, the lower ones widely scattering, oblong to obovately oblong, occasionally broadly lanceolate, the basal ones very short and obliquely obovate; the largest lamina 2 by 4 cm but most of them smaller, apex obtuse to acute except the reduced basal ones which are rounded, curing unequally green on its two sides, somewhat arcuate, inequilateral, only the basal part entire, otherwise dentately serrate, obliquely obtuse at the base, sessile, the upper side straight and narrow at the base, the lower side rounded or sublobulate at the base, the upper surface densely beset with minute cystoliths and a few scattered finely spiculose hairs; midrib sunken above, curved, prominent beneath and covered with whitish spiculose hairs; the basal pair of nerves arising suboppositely, extending up to the middle of the lamina and connecting with the tips of the 3 pairs of secondary nerves, all quite prominent and provided with long similarly colored setose bristles, the reticulations and their enclosed spaces also setose; the bud or axillary bracts oblong, diaphanous, yellowish green, obscurely ciliate and with cystoliths in the middle region, about 5 mm in length more or less. The cushion-shaped flower cluster dense and soft pubescent for the female heads, axillary, grayish green when fresh, more or less sessile, set upon the upper side of the stem, 5 to 8 mm across when dry, the subsessile cupular male heads smaller and less pubescent; involucre of male cups 4 mm long, divided into halves which however are united at their bases; segments oblong, the inner ones narrower, ciliate along the diaphanous margins, the carinate portion green, minutely corniculate at the apex; florets several, stipitate; perianth enclosing the stamen densely ciliate, with 5 prominent greenish apical points; anthers 2, short ellipsoid; involucre of numerous female florets rugosely plaited, quite thick, with a fringe of ciliated small segments around its edge; inner or floral ones surrounded and intermixed bracts very narrow, short ciliated, middle portion green especially toward the apex; achene brown, pointed, subtended by a perianth vestige, slenderly pedicelled.

Type specimen numbers 16322 and 14614, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915 and June 1916.

Collected on boulders and upon ledges with a thin covering of humus covered earth in a deeply shaded ravine at 1750 feet.—There are half a dozen species of Philippine *Elatostema* to which these specimens may be likened, but not having the type specimens in hand for critical comparison, it is difficult to know its true relationship.*

Elatostematoides caudatum Elm. n. sp.

Perennial and suffrutescent. Stems few to several, up to 6 dm in height, erect or the lateral ones ascending, 1 cm thick near the somewhat woody base, terete, smooth, dark or dull green, crookedly rebranched from near the ground; main branches freely rebranched, forming tangled masses, horizontally spreading, curved, the ultimate leaf bearing twigs suberect, glabrous, brownish black and

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* All the Bureau of Science specimens of *Elatostema* including the types was out on loan to *Dr. H. Wrinkler* of Breslau.

obscurely angular or ridged in the dry state. Leaves crowded from the ends of the numerous branchlets, alternate, coriaceous, mostly horizontal with recurved tips, shallowly curved upon the upper darker green side, curing dull brown, entire, entirely glabrous, subsessile or upon a very short petiole, inequilateral, arcuate especially toward the very gradually tapering caudate point, the larger blades 2 by 10 cm but most of them smaller, broadly to narrowly lanceolate, base inequilaterally obtuse or obtusely rounded on the larger laminae, both sides obtuse at the base, the lower or wider half terminating a few mm further down, cystoliths crowded on both sides but especially prominent on the upper surface; midrib prominent and ridged along the lower side, strongly curved, minutely and densely covered with cystoliths; the lateral pair of basal nerves arising 3 to 5 mm apart, submarginally extending up to the middle of the blade or beyond it, forming a continuous line with the faint secondary nerves, reticulations nearly obsolete; bud bracts fugacious, linearly oblong, glabrous, reddish brown on our specimens, up to 10 mm in length. Flower clusters whitish, both in the leaf axils or in the axils of the fallen leaves along the branchlets, 3 to 5 mm across, irregular in shape, sessile; the involucre saucer-shaped; its segments greenish, short, blunt, oblong, ciliate around the top and along the margins; inner bracts oblanceolate or obovate, closely surrounding the florets, brown when dry, equal or usually shorter than the involucral lobes, finely ciliate along the margins; staminate florets stipitate, glabrous; perianth segments 4, obovately oblong, subhyaline, also reddish brown on the dry specimens, thickened toward the carinate or recurved apical point, not ciliate, like the subtending bracts appearing minutely pitted; anthers included, 4, opposite each other, broadly elliptic, upon a short and thin filament.

Type specimen number 16445, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, March to August 1916.

Collected in well drained ground bordering the lower edge of woods at about 1250 feet elevation where it formed dense masses.—Possibly only a caudate form of *Elatostematoides rigidum* (*Wedd.*) *C. B. Rob.*

Laportea conduplicata Elm. n. sp.

A low or shrub-like tree. Branchlets 1 cm thick, glabrous, the twigs yellowish gray on the dry specimens, densely puncticulate. Leaves alternatingly crowded toward the ends of the rather thin twigs, yellowish brown when dry on both sides, widely spreading, thickly coriaceous, complanate, strongly recurved, obtuse at the base or acute in the smaller ones, varying from 2 to 4.5 cm wide across the middle, the larger ones 1 dm in length, the entire margins inclined to become involute in the dry state, the sharply acuminate tips falcately recurved in the dry state, glabrous, densely puncticulate on both sides; midrib stout and prominent beneath, sunken above, also puncticulate; nerves 5 to 8 on each half of the blade, arcuate, relatively thin, their tips finely united, the basal pair arising a few mm above the base of the blade and suboppositely, reticulations quite evident beneath and sunken on the upper face; petioles similarly colored and puncticulate, 1.5 to 2.5 cm long, with a few reflexed spicules on their under sides especially toward the distal end, somewhat striately ridged toward the expanded base, caniculate along the upper side, leaving pronounced circular scars after falling; bud bracts ovately oblong yet sharply pointed, 5 to 8 mm long more or less, appresed hairy on the outside in the young ones, caducous. Inflorescence axillary or from the fallen leaf axils, 3 to 5 cm long, gracilis, few branched from the middle, the ultimate branchlets slender and nearly at right angles; the peduncle and branchlets glabrous, appearing compressed and more or less twisted in the dry state; staminate florets in small cluster, the clusters unequal in size and well scattered; involucre salviform, membranous, persistent, reddish brown streaked, its segments ovately oblong and unequal in size; calyx subglobose, upon a slender stalk, nearly glabrous on the exterior, also reddish brown; the 4 sepals forming obscure lobes, adnate but ultimately free with overarching tips, oblong, well including the stamens; the broad anthers strongly inflexed; their filaments brown, winged, twice as long as the sepals but doubled over on the inner side, inserted upon the basal portion of the calyx segments.

Type specimen number 17152, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Collected in woods along dry creek beds of the hill vegetation.—Very similar to *Laportea triplinervia Merr.* from Mt. Pulog but our leaves are smaller, thicker in texture, not flat but strongly conduplicate, grayish white puncticulate on both sides, with no cystoliths beneath as on *Merrill's* type.

Laportea latilanceolata Elm. n. sp.

A low and somewhat spreading tree. Twigs ascending, glabrous, 5 to 8 mm thick on the dry specimens, the leaf bearing tips pale green, ringed by the old leaf scars. Leaves ascending or horizontally spreading, subcoriaceous or submembranous, drying brown beneath and gray above, densely chalky white puncticulate on the upper side, less so on the lower surface, cystoliths none, alternatingly crowded toward the ends of the branchlets, flat but the gradually tapering and acuminate tips usually recurved, the base of the larger lamina broadly rounded, that on the smaller ones broadly obtuse, the larger blades 2 dm long and 8 cm wide across the middle or a trifle below it, those of the smaller lamina are half as large and acute at the apex, smooth and glabrous on both sides, entire; midrib pronounced beneath and dull or reddish brown beneath, also glabrous; nerves 6 to 9 on each half of the leaf, the basal pair subopposite and arising from near the base of the blade, mostly oblique or ascending; the upper nerves ascendingly curved especially toward their ends where they are usually united, also conspicuous and reddish brown beneath, cross bars and reticulations quite evident beneath; petiole stout, 4 to 7 cm in length for the mature leaves, blackish brown when dry, those of the small leaves varying from 1 to 3 cm long; bracts leather brown, glabrous, 5 to 8 mm long or longer, narrowly oblong, imbricate, deciduous. Inflorescence from a few cm to 10 cm in length, branched from below the middle, recurved toward the end, the branchlets mainly along the upper side, axillary or subaxillary, its subtending leaves small, glabrate, the succulent peduncle and branchlets curing blackish brown and more or less compressed; its short branchlets strap-like and provided with a few spiculae; female flowers several and scattered toward the ends of the branchlets, erect or ascending, sessile in the young ones, upon short and broad pedicels in the fruiting stage; perianth less than 0.75 mm long, divided into 4 unequal segments; ovary sessile, compressed, abruptly constricted into a tail-like more or less scabrous style; achene perianth persistent, usually upon very short and flat pedicels, the 2 outer segments broadly ovate and reddish brown spotted, the inner segments much narrower and somewhat shorter; seed likewise sessile, ovoid from the flattened side view and obscurely oblique, distinctly pointed, terminated by the recurved and more or less twisted style, finely scabrous.

Type specimen number 15206, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Discovered this *Laportea* in rich alluvial soil of mixed woods along a creek bed of the foot-hills.—Its different foliage throws it out of consideration with *Laportea agusanensis Elm.* In *Laportea luzonensis (Wedd.) Warb.* the leaves are oblong to elliptically oblong, not broadly lanceolate and are densely puncticulate on both sides.

Polychroa platyphylla Elm. n. sp.

Succulent dioecious herbs. Old stem decumbent, the younger ones suberect, terete, 2.6 cm thick, dull green, occasionally branched, fibrous rooted at the lower joints, the leafy portion suberect, thoroughly squashed and black on my specimens, glabrous, the branches quite similar except thinner. Leaves copious, alternatingly scattered along the stems and few branches, flat, horizontal or descending, coriaceous, a trifle paler beneath on the live specimens, similarly black when dry, glabrate, usually opposed by a foliaceous bract, subsessile or upon very short petioles, oblong in general outline, sometimes appearing a little inequilateral, base suboblique and obtuse, the lower half extending a trifle further down and more rounded than the upper acute side, 12 to 16 cm long by 5 to 7 cm wide at the middle, the smaller or much reduced interspersed leaves subelliptic in shape, the basal one third of the lamina entire, otherwise coarsely serrate or dentately so clear up to the long acuminate point; midrib prominent beneath and glabrous; nerves 5 to 8 on each side of the blade, oblique or ascending, 2 to 3-crowded toward the base, quite conspicuous from both sides, their apical portions reticulately united, the intervening reticulations coarse and very evident on the lower surface. Female flowers in small sessile and axillary heads, in the old condition glabrous, the individual florets subtended by short setaceous bracts; pedicels persistent, 5 to 8 mm long in the fruiting state, strap-like; perianth segments 5, oblong, shorter than the pedicel, the margins subhyaline, free nearly to the base, imbricate, reddish brown, bearing long and slender appendages from the dorsal side below the bifid apex, punctate; ovary compressed, sessile, subtended by glands; male flowers in dense fleshy heads 1 to 3 or even 5 cm across, upon a stout 5 to 15 mm long peduncle arising from the leaf axils, also glabrous; the individual florets subtended by small bracts, subglobose, upon ribbon-like pedicels; the perianth segments 5, oblong, strongly concavo-convex, yellowish brown and coarsely punctate or appearing pitted; anthers inflexed, triangularly ovate, as many as there are segments and inclosed by them; filaments somewhat compressed, inserted upon the ventral basal portion of the perianth lobes.

Type specimen number 14465, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Discovered upon humus covered damp soil among boulders of woods at 500 feet altitude.—In 1908 *Elatostema laciniatum Elm.* was published. In 1915 it was transferred to *Pellionia*, but I made the mistake in redescribing the same species, not the same number, under *Pellionia sordida Elm.* Number 9196 and 14251 are no doubt the same species, and are placed under *Polychroa sinuata* (*Blm.*) *Merr.* Our new species here proposed seems quite distinct, and my number 13491 is also very different and is published below under a new name.

Polychroa urdanetensis Elm. n. sp.

A creeping and herbaceous biennial. Stem or stems decumbent at the ground, taking root at the lower joints, varying from 1 to 5 dm in length, succulent at the base, otherwise rather slender, the robust stems few to severally rebranched, the shorter stems simple, the dry ones striately ridged, glabrate or minutely pulverulent, curing blackish brown. Leaves alternate, scattered, drying unequally dark brown on its two sides, short petioled, flat or its acuminate to caudate apical point recurved, often with a small opposite bract, linear to broadly lanceolate in outline, the larger ones 1.5 cm wide below the middle and 4 cm long but often with small much reduced subelliptic ones intermixed, slightly inequilateral, the base a trifle oblique and obtuse to broadly obtuse to rounded, the basal one third of the lamina entire, the upper margins with few to several and comparatively coarse teeth, the largest of which are just below the entire caudate apex, glabrous but with cystoliths on the upper side only, the lower surface on some leaves minutely puncticulate; midrib darker brown beneath on the dry specimens, with 2 to 4 ascending and similarly colored nerves on each side, reticulations quite obscure. Inflorescence glabrous, mostly axillary, subsessile or upon short stalks; florets clustered in several groups, young and old ones intermixed, subtended by bracteoles, female; their pedicels persistent, linear, up to 5 mm long, articulate at the apex, brown, subhyaline; perianth united at the base in the early stage, becoming free, 3 mm long or longer with the very slender appendage, ovately oblong or broadly lanceolate, gradually tapering into the apical tail; ovary subtended by knob-like glands, surrounded by small linear inflexed staminodes and enclosed by the perianth segments; achenes subcompressed, suboblique, ovate from the side view, glabrate or minutely pulverulent.

Type specimen number 13491, *A. D. E. Elmer*, Cabadbaran (Mt. Urdaneta), Province of Agusan, Mindanao, July to October 1912.

Gathered in well shaded places upon stones of a creek embankment and forming masses upon boulders at about 750 feet elevation.—This specimen number 13491 was erroneously distributed as *Pellionia laciniatum Elm.* from which it is obviously distinct.

RUBIACEAE

Argostemma maquilingense Elm. n. sp.

Somewhat succulent annuals. Stems erect, usually clustered from a matrix of roots, ranging from 5 to 10 cm high, dirty brown puberulent toward the ground and pubescent toward the top, greenish but curing dull or dark brown, slender. Leaves more or less scattered from the base to the top but more numerous toward the top, very membranous, much paler green and lighter colored beneath, the upper side blackish brown when dry, in the fresh state dark velvety green except the very pale green zone along the midrib, entire, in unequal opposite pairs, the upper or terminal ones generally larger, 1.5 cm by 3 cm long without their petioles, most of the laminae smaller or even bract-like, 1 by 2 cm measure most of the blades, apex chiefly acute to obtuse, base obtuse or short and broadly cuneate, equilateral, oblong or the smaller ones obovately so, the foliaceous interaxillary bracts rotund, smooth and nearly glabrous on the upper face, below similar, midrib with nerves not glabrous; midrib reddish brown on its lower side, conspicuous, usually puberulent especially toward the base or petiole; nerves 3 to 5 on each side according to size, faint, upwardly arching, the larger ones minutely puberulent, reticulations obsolete; petioles crisply pubescent at least along the lower side and edges, very slender, 5 to 10 mm long or those for the smaller leaves shorter, the foliaceous bracts sessile. The solitary or 2 to 3-clustered flowers equalling the foliage or shorter, pendant in anthesis; peduncle terminal or from the upper leaf axils, erect, 1 cm long, glabrate, subtended by leaves or foliaceous bracts; pedicels densely tawny pubescent, one half as long or with age longer, subtended by narrow acutely pointed bracteoles; calyx urn-shaped, covered with numerously septated yellowish brown hairs, 5-segmented; segments glabrous on the inner face, pubescent along the middle dorsal side, recurved, gradually tapering from the base to the sharply acute apex, more or less united around the ovary top, 1.5 mm long, rather narrow; corolla white, 4 to 5 mm long, strict, erect, united below the middle, inserted on the inner side of the calyx rim, the 5 segments fringed with septate hairs and acuminately pointed; pistil also erect, straight, glabrous, equalling the petals, the ovary ovately elongated, the style 2 mm long or as long as the ovary and terete, terminated by a small capitate stigma. Fruit subglobose, bearing the withered calyx segments, 4 mm in diameter, flattened at the top, the carpels with many dark brown irregularly shaped seeds 0.5 mm in length.

Type specimen number 17637, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Collected in the wet mossy summit woods. — *Elmer* 16541 from Mt. Bulusan is apparently this same species. It is a much more delicate plant than the coarse and rank *Argostemma solaniflora Elm.* of the lower regions, and is conspicuously marked in the field by its lighter green zone along the midrib. Our leaves are smaller, obtuse, whitish beneath, and on the whole our species is far less pubescent if not subglabrous.

Argostemma pedicellatum Elm. n. sp.

Annuals. Stems erect or ascending, greatly varying in length from 1 to 7 cm, glabrous or puberulent, at the base frequently decumbent and forming colonies, with fibrous roots at and from near the base, soft in texture, very pale green, in the dry state appearing quite slender and straw brown in color, bearing at the top an irregular whorl of leaves and flowers. Leaves ascending or horizontally spreading in a rosette, very unequal in size, the lower opposite pair usually very unequal, membranous, paler beneath even in the subolivaceous dry state, smooth and glabrous on the upper surface, beneath more or less crisply puberulent, entire, the lamina portion 2 by 4 cm for the largest ones but with all sizes down to 1 cm in length and half as wide, a short distance above the lower pair of leaves is a crowd of very unequal leaves oppositely crowded in a subwhorl or rosette, blades ovately oblong to subelliptic, often a trifle oblique at the obtusely rounded or short cuneate base, apex obtuse to obtusely rounded in the smaller ones, rarely acute, the longer stems sometimes provided with a pair of bract-like leaves at about the middle of the scape-like stems: petioles much varying in length from 5 to 20 cm, slender, stramineous when dry, flattened, minutely ciliate along the lower side and margins; midrib rather widened toward the base, conspicuous beneath, sparsely short ciliate; nerves ascendingly curved, 4 to 6 on each side of the midrib, relatively faint, similarly ciliate or crisply puberulent, those on the small leaves fewer and scarcely evident. Flowers few to numerous, as many as a dozen arising from the uppermost leaf axils and unequal in maturity; pedicels slender, yellowish brown in the dry condition, subcompressed, also varying from 1 to 4 cm in length, finely pubescent especially along the edges and toward the top, occasionally provided with bracteoles, from the lower bracts the pedicels are usually forked or branched, slightly and gradually thickened toward the calyx; flower calyx roundly cup-shaped, its pubescent hairs minutely septate, bearing a rim of 5 segments; the segments thin and transparent, united at their broad bases, short ovate, broadly obtuse to rounded at the apex, glabrate except the basal exterior portion, coarsely and finely reticulate, slightly unequal in size; ovary imbedded, flatly rounded at the apex. Fruit crowned by the persistent calyx segments; its carpels contain numerous brown seeds; the seeds compressed, glabrous but appearing pitted, irregular in shape from the side view but mostly subtriangular, 0.5 mm across.

Type specimen number 18412, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Found intermixed with other small herbaceous plants in damp shallow soil of creek banks in the forests at medium altitudes.—*Elmer's* number 6657 collected on Mt. Mariveles thirty years ago is the same species, though a little more pubescent. The flowers of *Argostemma wallichii Walp.* are described as 4-merous, and *Argostemma neesianum Walp.* as 5-merous, otherwise the descriptions are similar. Since most of our species of *Argostemma* flowers are 5-merous, might there not be an error somewhere?

Argostemma rupestrinum Elm. n. sp.

Rather small annuals. Stems 5 to 15 mm high, single or sometimes short branched, scattered or sometimes in gregarious clusters, erect or suberect, blackish when dry and covered with a yellowish brown pubescence especially toward the top, occasionally with a greenish bract. Leaves chiefly ascending, thinly membranous, flat, mostly from the distal end of the stem but frequently scattered along the stem, the lower ones opposite and quite unequal in size, those toward the top subopposite and somewhat clustered, glabrous or sprinkled with a few short hairs on the upper side, glabrate beneath except the nerves, much paler beneath even in the blackish brown state, the margins entire, very variable in size and shape, the larger lamina 5 to 15 mm in length, 5 to 9 mm in width across the middle but sometimes above this, most of the laminae smaller to much smaller, lanceolate to elliptically oblanceolate, the smallest leaves of the stem obovately rotund, glabrate or with a few crisp hairs on the upper side, beneath glabrous except the nerves and midrib, equilateral, obtuse to acute at the base, apex acute to obtuse or obtusely rounded; midrib crisply dull brown pubescent beneath, less so above, relatively prominent or conspicuous; lateral or side nerves 3 to 5, interarching, obscure, oblique, similar in pubescence; petiole very slender, 3 to 5 mm long, subcompressed, dull or yellowish brown pubescent especially along the lower side. Flowers terminal, erect, equalling or exceeding the foliage, usually solitary, rarely more from each plant stem; pedicel 1 cm long or shorter, thin, tawny pubescent, the hairs septate, at the base subtended by an unequal pair of foliaceous bracts; calyx bowl-shaped, densely covered on the outside with long hyaline bristles which are numerously septate; segments 5, two of which seem a trifle larger, 3 mm long, ovately lanceolate, apex subacuminate, base broadly rounded and inserted upon the rim, glabrate except on the basal dorsal portion, prominently veined longitudinally, recurved or reflexed; ovary imbedded, bearing a plate-like sessile stigma. Fruit about 4 mm thick, campanulate, with the half withered calyx segments persisting; the carpels filled with very numerous seeds; seeds flat, dark brown, irregularly triangular to quadrangular from the side view, glabrous, 0.5 mm across.

Type specimen number 16175, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, May 1916.

Discovered this small species of *Argostemma* on the sides of moss covered boulders lying in a dry stream bed of deep and densely shaded ravines at 2250 feet altitude.—Quite distinct from *Argostemma neesianum Walp.*, and apparently also from *Argostemma wallichii* of the same author.

Argostemma umbellatum Elm. n. sp.

Succulent annuals or biennials. Stems erect, somewhat curved, decumbent, several and forming masses, greenish but the dry ones dull yellowish brown or ground colored, watery especially toward the ground portion, up to 2 dm long or longer, variable in size, glabrate toward the base where they bear a profusion of fibrous roots, yellowish brown scurfy or pubescent toward the top or leaf bearing portion. Leaves chiefly crowded toward the top, submembranous, paler green beneath, drying very unequal in color on the two sides, entire, opposite, the pairs very unequal in size, ascending or horizontal, the upper or largest lamina 2 cm wide by 6 cm in length, base obtuse to subcuneate and a trifle oblique, otherwise equilateral or nearly so, often appearing somewhat curved toward the sharply acute or slenderly acuminate apex, the smaller lamina elliptic in shape and obtuse to obtusely rounded at the apex, the majority of blades are oblong although the smaller terminal ones are lanceolate, while the lower ones are broad and subrotund, upper surface sprinkled with crisp hairs which wear off with age, the lower face similar except the midrib and nerves; the interaxillary bracts rounded and sessile; midrib very conspicuous, yellowish brown pubescent beneath, usually a trifle curved in the larger leaves; nerves 3 to 5 or 6 from each side of the midrib, much less prominent, ascendingly curved, their ends reticulately united, the intervening reticulations not evident; petioles stout, subcompressed, scurfily pubescent on the lower side, up to 1 cm in length but most of them shorter, the foliaceous bracts sessile or nearly so. Inflorescence erect, mainly terminal, equalling the foliage; peduncle subtended by small lanceolate leaves, quite slender, 2 to 3 cm long, sometimes provided with a pair of small bracts but usually ebracteolate, nearly glabrous, the less vigorous ones with a single umbel of flowers at the distal end and with 2 or 3 short branches each bearing a cluster of flowers; branches varying from 3 to 9 mm in length, more or less pubescent or glabrate, subtended by linear glabrate bracts; the pedicels filiform, light tawny pubescent, up to 1 cm in length, ascendingly spreading, finally divaricate and recurved; ovary subcampanulate, covered with curved subhyaline and numerously septate hairs; segments 5, subequal in size, triangular and acute, the broad base more or less united and forming the calyx rim, prominently veined, glabrous on both sides except the middle portion on the back toward the base. Fruits 4 mm across, subglobose, crowned by the persistent calyx whose segments are broad at the base and apiculately pointed; ovary imbedded, truncate at the top, the carpels contain very numerous seeds; seeds bony, dark brown, compressed, triangularly irregular, its inner angle rather sharp.

Type specimen number 15701, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, April 1916.

Gathered among other small herbaceous plants in deep densely shaded gulches at 1500 feet above sea level.—Leaves similar to *Argostemma solaniflora Elm.*, but our inflorescence is decidedly umbellate, with shorter and broader petals which are distinctly veiny and not ciliate along its margins. From *Argostemma maquilingense Elm.* it is separated by its different foliage and inflorescence.*

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* Incidentally, in the study of these few but critical species of *Argostemma*, I had to refer to one of my first described plants from the Philippines, published on the second page of this publication and based on a specimen of this genus which I collected in 1904. It brought to my mind most vivid recollections of our first beginnings, when something had to be done, for the field was large and the workers on hand. So this publication was started as a means through which my own work and the reports from other authors upon my materials could be published.

Dolicholobium hirsutum Elm. n. sp.

A shrub. Stems few, 5 to 8 dm thick, crooked, branched from the middle; wood quite hard, dingy white, odorless; bark smoothish, gray or brown; main branches also crooked, widely spreading, the terminal twig short, the subterminal one slender, terete, dull reddish brown when dry, the apical portion long ciliate but with age becoming glabrate. Leaves opposite. usually crowded from the ends of the twigs, occasionally single or with a pair of leaves some distance below the apical cluster of leaves, membranous, flat or the abruptly acuminate or setaceously pointed apex recurved, yellowish brown beneath, blackish brown above in the dry state, base cuneate to broadly obtuse, horizontal or descending, the larger lamina on my specimen 16 cm long by nearly one half as wide across the middle, oblong in shape, entire, equilateral, the smaller ones 3 by 10 cm, the upper face pretty well sprinkled with long ciliate hairs, the lower face even more so; midrib prominently ridged beneath, densely covered with long reddish brown hairs; nerves 7 to 9 on each side, the lower ones strictly oblique, the upper ones ascendingly curved toward their tips, provided with similar light brown bristles and a reddish brown pubescence, the cross reticulations quite evident from below and in vestiture the same; petioles 1 to 2 cm long, brown and soft in texture, densely covered with setose hairs. Inflorescence shorter than the leaves, from the uppermost leaf axils, ascending, 6 to 10 cm in length, rusty brown villous, the 3 to 4 cm long peduncle quite slender, terminated by a few flowers; pedicels 2 to 3 cm long, the one with a flower in anthesis considerably thicker and bearing a crown of 5 segments; segments linear to lanceolate, 1 cm long, ciliate on the back only, strongly veined; corolla tube fully 1 cm long, erect, set upon the pedicel end and surrounded by its bracts or segments, pubescent on the exterior, with 5 strongly recurved or reflexed and twisted lobes; segments cremeous, 1.5 cm long, narrowly oblong, pubescent, on the dorsal side only, the rounded base imbricate; stamens 5, included below the throat; the anthers subsessile, erect, linear, 1.5 mm long; styles or rather stigmas composed of 2 spatulate fleshy lobes extending up through the circle of the stamens. Fruit linear, terete, green but brown and hirsute in the dry state, 10 to 15 cm in length, ascendingly curved toward its distal end and terminated by the persistent bracts.

Type specimen number 14370, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Discovered along stream cuts near the ridge of Mt. Bulusan at 1500 feet altitude. — Leaves setose on upper and lower sides, not glabrate as on *Dolicholobium philippinense Trel.*, the only other Philippine species of this genus thus far known. There are a number of other distinctive characters, such as the different cut of the leaves and differences in the flowers.

Hedyotis irosinensis Elm. n. sp.

An annual or biennial herb. Stems many, decumbent at the base, very slender, pale green, taking slender fibrous roots from the lower joints, subterete or appearing compressed in the dry or pressed condition, variable in position from reclining and ascending to erect, in length from 1 to 5 cm, the longer ones rebranched from near the base, its side nearest to the ground often fringed with ciliate hairs, otherwise glabrous; the slender branchlets ascending toward the top, the lower ones more divaricately spreading, often appearing angled at the nodes, smooth and entirely glabrous except in the the vicinity of the joints. Leaves subcoriaceous, well scattered, mainly opposite, flat but the entire margins involute, very unequal greenish brown on its two sides in the dry state, the larger ones measure 6 mm wide and 4 cm long but most of them only half that size, linear to narrowly lanceolate, gradually tapering to the sharply acuminate point, the subsessile base acute to obtuse, glabrous, grayish white beneath, dull greenish brown above; petiole quite short; midrib pronounced beneath, grooved or impressed above, dull colored beneath, glabrous, nerves few and very obscure or not present; interaxillary bracts broad at the base, appressed, its basal sides expanded and more or less connected to the petiole base, puberulent on the outside and in the stem region below it, 5 mm long including the long central slightly ciliate appendage, with a few minor appendages along the upper edge of the expanded portion. Flowers in few to several short axillary cymes; pedicels as long as the branchlets, subtended by variously sized and sharply pointed bracts whose edges are usually short ciliate; calyx turbinate, puberulent, 4-segmented; the segments 1 mm long or as long as the calyx cup, narrowly triangular, sharply pointed, edges finely ciliate, persistent, recurved when old; corolla short tubular, 3 mm long with the 4 lobes, one half as thick, the recurved lobes blunt at the apex, glabrous, subhyaline; stamens 4, alternating with the segments and inserted upon the throat; filaments slender; the anther versatile, narrowly oblong; style short, erect, included in the corolla tube, with a forked stigma. Capsular fruit 2 mm in diameter, globose, upon a slender 3 mm long stalk, at the flattened top bearing a crown of apiculate calyx segments; carpels bony, opening in halves, slightly scabrid on the exterior; seeds angularly rotund in outline, very dark brown, 0.5 mm across, about half a dozen in each fruit.

Type specimen number 17394, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Collected in the hill vegetation, in open places of rather dry ground at 1000 feet elevation.—It reminds one of a number of our Philippine species of *Hedyotis* with linear leaves and axillary inflorescences, but its nearest alliance would seem to be with *Borreria stricta* (*Linn.*) *Mey.*, but that species has dense sessile axillary flowers and solid masses of axillary fruits.

Hedyotis trisecta Elm. n. sp.

Low undershrubs. Stem a meter or two high, oppositely rebranched; branches spreading, forming a laxly tangled mass, smooth, pale green even in the dry state, angular, with grooved and ridged sides, the young apical ones suberect. Leaves also opposite, the pairs frequently unequal in size, flat or recurved toward their tips, submembranous, entire, gradually tapering from below the middle to the sharply acuminate apex, base short cuneate, equilateral, lanceolately oblong for most of them, the smaller ones lanceolate and often with slightly curved tips, olivaceous green when dry, well scattered along the branchlets, even the branches subtended by them, the largest lamina 3 cm wide a trifle below the middle by 1 dm long; midrib narrowly caniculate above; nerves much ascending and upwardly curved, rather faint yet clearly evident from both sides, 4 to 6 on each half, reticulations few and barely visible; petioles 1 to 2 cm long, expanded at the base, caniculate along the upper side, wholly glabrous; interaxillary bracts 4 to 7 mm long, broad at the base whose sides are rounded and minutely ciliate along the edges in the early state, erect and appressed, the central portion abruptly constricted into a central appendage with a lateral one on each side, trisected. Inflorescence subpaniculate, less than 5 cm in length, shorter than the foliage, totally glabrous, ascending, its slender peduncle straight; the first or main pair of branches at or from about the middle, divaricate, very slender, 1 to 1.5 cm long; their subtending bracts green, linear to oblong, 3 mm long; pedicels 5 to 8 mm long, widely spreading, subtended by minute bracteoles, more often than not in threes from the ends of the lateral pair of branches, usually clustered toward the end of the rachis; calyx campanulate, 3 mm long including the 4 lobes, somewhat constricted at the rim; lobes free, acute to obtuse, erect, greenish, 1.5 mm long, oblong to narrowly oblong; corolla whitish, tubular, 6 mm in length, the tube portion 2 mm thick, 4-lobed above the middle; lobes oblong, obtuse, recurved, glabrous on both sides except the basal upper side which is pubescent; stamens 4, inserted and alternating with the corolla segments, erect, the exerted portion of the filaments glabrous and a trifle shorter than the petals, the adnate tubular portion of the filaments hairy especially so toward the throat; anthers versatile, short, linear; pistil included, the style smooth and divided toward the top, each division terminated by a clavate stigmatic brush. Fruits globose or subellipsoid, dehiscing into halves, the bony carpels becoming much twisted; seeds dark brown, minute.

Type specimen number 14885, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Gathered in light woods of moist but rich soil at medium altitude.—This species approximates *Hedyotis sibuyanensis Elm.* and *Hedyotis brachyantha Merr.*, but it can readily be distinguished from either by its differences in leaves, inflorescence, flowers and interaxillary stipules.

Hypobathrum multibracteata Elm. n. sp.

Erect undershrub. Stem 2 to 3 cm thick, 2 m high, terete, branched mainly toward the top; wood not hard, with a large pith yet quite rigid; bark dull brown, longitudinally checked when old; main branches divaricate, sparingly rebranched, the branchlets slender and gradually recurved; the ultimate portions or twigs smooth, opposite, glabrous, slightly flattened or expanded at the leaf attachments, green when fresh but nearly black when dry. Leaves in opposite pairs, regularly scattered, submembranous, paler beneath even in the dry state, recurved especially toward their tips, curing pale brown beneath and murinous on the upper surface, gradually and slenderly acuminate at the apex, the normal laminae obtuse to broadly obtuse at the base, acute on the smaller ones, the average blades 2.5 by 9 cm, the smaller or terminal leaves 1.5 cm wide and 6 cm long or the apical ones even smaller; petioles 2 to 4 mm long, grooved on the upper side, rather thin, likewise glabrous; midrib smooth, blackish brown and conspicuous beneath; nerves 4 to 6 on each side of the midrib, less conspicuous but very evident beneath, ascending, their ends arcuate and united; coarse reticulations plainly visible; interaxillary stipules 3 mm or longer, with a widened base and setaceously pointed, coriaceous, glabrous except for the basal fringe of short hairs, apparently early falling or breaking of the stiff point. Inflorescence axillary, chiefly from the uppermost leaf axils; peduncle glabrate, usually solitary from each axil, recurved, very slender, varying from 3 to 12 mm in length, the short young ones straight and ascending, the lower or older ones terminated by a dense mass of short cymose branches no more than 1 cm across; branchlets very thick and short, divaricately forked, all subtended by unequal but numerous bracts and bracteoles which are short and blunt or longer and setaceously pointed; bracteoles persistent and usually a trifle ciliate along the edges or margins; flowers terminal or from the younger tips or branchlets, subsessile, subtended by similar bracteoles; calyx turbinate, 3 mm long, terminated into 4 or 5 sharp teeth; corolla tubular, inflated at the base, obscurely constricted at or near the middle portion, bearded at the throat; stamens 4 or 5, sessilely inserted upon the corolla tube and included by it, 1.5 mm long; anthers linear, minutely auriculate at the base which bears a tuft of hyaline hairs; style strict, the lower portion glabrous, the upper part more or less bilobed, the stigmatic portion white ciliate; ovary top rounded and glabrous, smooth.

Type specimen numbers 15925 and 15674, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, April to May 1916.

Collected in loose stony ground of densely forested ravines at 1500 feet above sea level.—*Hypobathrum purpureum (Elm.) Merr.*, but our leaves are narrower and with fewer nerves. There are also floral differences to be noted.

Ixora irosinensis Elm. n. sp.

An undershrub. Stem 3 cm thick, 2 m high or long; wood tough, white, covered with smooth brown bark; main branches few from above the middle; the twigs spreading, slender, the apical portion greenish and subcompressed and grooved toward the end, glabrous. Leaves also glabrous, oppositely scattered, occasionally unequal in size, 10 to 15 cm long, 3 to 5 cm wide at the middle or widest portion, sometimes with much shorter or much narrower blades besides the foliaceous bracts subtending the inflorescence, subchartaceous, flat, deeper green above, curing similarly brown on both surfaces, widely spreading, glabrous even on the midrib and nerves beneath, entire, gradually tapering to the acute to acuminate apex, the normal ones broadly rounded at the base; petioles very short but stout, 5 mm long, deeply grooved above, leaving large scars after falling; midrib ridged beneath clear into the apex and terminated by a short mucro, narrowly caniculate on the upper face; nerves 6 to 9 on each half of the blade, conspicuous, divaricate from the midrib, ascendingly curved toward their ends which are usually connected, with scattered minor nerves in between the larger ones, reticulations quite evident; interaxillary stipules setaceously pointed, fugacious. Inflorescence 5 to 7 cm long, paniculately or corymbosely branched from above the middle, about as wide across the main branches; peduncle strictly erect, near the base jointed and surrounded by a whorl of sharply pointed and unequal bracts and with short and blunt bracteoles, sometimes subtended by a pair of unequal foliaceous bracts; branches numerously rebranched from below the middle, all subtended by sharp bracteoles, glabrate; pedicels variable in length, puberulent, subtended by apiculate teeth; calyx 2 mm long, subtended by a pair of apiculate teeth, 4-toothed at the top; corolla 1.5 cm long, straight, its tube very slender and glabrous inside, the apical lobular portion fusiform in the bud state; the 4 segments strongly imbricate, in anthesis becoming sharply reflexed, lanceolate, 6 mm long; stamens 4, alternating with the lobes and inserted upon the glabrous throat, the subcompressed filaments 2 mm long; anthers linear, versatile, 1 cm long, that portion below the filaments bilobed or rather forked; style filiform, thickened toward the divided apex, strict and much exceeding the other floral parts. Fruit globose or slightly flattened, 5 to 8 mm in diameter, black when dry.

Type specimen numbers 17301 and 16480, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June to September 1916.

Discovered in wet fertile ground of densely shaded woody depressions at 1750 feet elevation. — Quite like certain forms of *Ixora cumingiana Vid.*, but from *Cuming* 1233 our specimens differ in having longer and differently shaped leaves with prominent nerves, short petioles, and with far more numerous flowers. It was distributed under a wrong name.

Lasianthus bulusanensis Elm. n. sp.

An erect low undershrub. Stem 1.25 cm thick, terete, up to 1 m high; wood greenish, rather rigid, with a large pith, covered by similarly colored smooth bark; main branches from the middle, nearly at right angles to the stem, the widely spreading terete branchlets covered with a densely appressed blackish brown pubescence. Leaves chartaceous, horizontal, flat except the recurved tips, lucid and deeper green on the upper face, curing grayish brown on both sides, entire, lanceolate to narrowly oblong, gradually tapering to the caudate apex, base acute to broadly acute, opposite and in rows, many and well scattered, 6 to 9 cm long, 1.5 to 2.5 cm wide across the middle, glabrous above; petioles up to 5 mm in length, stout, dark pubescent; midrib pronounced beneath, yellowish brown or subolivaceous pubescent; nerves 5 to 7 on each side, also conspicuous beneath, ascendingly arched, similarly pubescent; cross bars and reticulations finely strigose of a lighter brown color, the midrib and nerves conspicuously grayish white on the upper surface only; interstipular bracts short and densely hairy. Flowers erect, solitary or few clustered in the leaf axils, sessile or nearly so, from the uppermost axils while the lower axils bear the fruits, subtended or surrounded by dirty brown ciliate hairs; calyx 2 to 3 mm long, subturbinate, pubescent especially toward the 4 or 5-apiculate apex. Drupes subglobose, becoming glabrate except around the flattened apex, 3 to 5 mm in diameter, most of them with longitudinal grooves in the brownish black and dry state; pyrenes 3-sided, hard, 5, the outer concave side tightly adhering to the fleshy skin, the inner two sides plane and smooth, occasionally a trifle unequal in size, pointed at both ends.

Type specimen number 16532, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, July 1916.

Collected this species of *Lasianthus* in moist humus covered ground of forested flats at 2500 feet altitude of Mt. Bulusan. — Specimens in the Bureau of Science herbarium considered typical *Lasianthus tashiroi Mats.* has smooth and glabrous twigs. However the vestiture on the branchlets of our specimen is as in *Lasianthus clementis Merr.*, but our leaves are narrower, gradually extended into caudate points and base acute, not broadly rounded.

Myrmecoides sorsogonensis Elm. n. sp.

A perennial epiphyte. Tuber 2 to 4 dm thick, slightly longer than wide, rugose but not strongly so, grayish green especially the hypodermal layer, the inner or meaty portion white and herbaceous, provided with irregular quite large cavities, the channel walls brown. (these main bulbs or tubers stand at an angle to the stem or branch of its support, and usually from near the base it produces a few roots which twine and circle about its host); outer surface coarsely rugose or wadded, irregular in outline, more or less roughened by longitudinal ridges beset with spines; the 5 to 15 mm long or longer spines, usually in small groups and pointing in various directions, not sharp nor stiff. Neck or leaf and flower bearing stem arising from the upper end of the tuber (sometimes with one or two additional short ones from the base), ascendingly curved, terete, 5 to 7 dm long, 5 cm thick, with 4 more or less twistingly curved leaf rows alternating with the ciliated bract-protected flowering and fruiting rows. Leaves few and in rows, thick and rigid, brown when dry, terminal, quite unequal in size, the larger lamina 8 by 18 cm, entire, glabrous, flat and ascending, base subcuneate or blunter, apex rounded and terminated in a short acute point, elliptic; midrib stoutly ridged beneath especially toward the base, grooved along the upper leaf surface; nerves 5 to 7 on each half, oblique, fairly straight except the ascendingly curved tips, prominent on both sides, cross bars and reticulations faint; petiole thick, whitish in the fresh specimens, 5 to 10 cm in length, sunken along the upper flat side, at the base provided with a thick and rigid oblong plate 1 cm in length, the petiole ridge provided with flatly spreading spines covering the alternating rows of flowers and fruits. Flowers in deeply sunken rows between the foliage, subsessile; calyx short cup-shaped, with broad teeth, surrounded by reddish setose hairs; corolla subhyaline, glabrous, white, 1 cm long, angularly tubular, terminated by 4 short and blunt teeth; anthers included, as many, subsessile, bilobed at the base. Drupe 1 cm long, juicy, obovoid, glabrous, shining deep red; achenes obconic, 3 to 5 mm long, plane on the inner surface.

Type specimen number 15964, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, March to August 1916.

Collected from the limbs of trees in a humid densely wooded flat along a stream bed at 1500 feet elevation.—*Myrmecoides sibuyanensis Elm.,* but with broader leaves, nerves more prominent and tuber beset with longer spines. These curious plants love to live upon the higher limbs of trees along creek beds of the lower altitudes or along the ridges of higher elevations where the light and air has a free sweep. The tuber or cluster of unequal tubers is inhabited by ants which enter by way of the root system. When a plant is carefully removed from its host with the roots intact, it soon withers.

Ophiorrhiza argostemmoides Elm. n. sp.

Small terrestrial annuals. Stem short, up to 3 cm high, stout, with masses of fibrous roots, mostly erect, often reclining at the base, dirty brown furfuraceous and pubescent, rarely branched, bearing toward the top few to several pairs of leaves. The lower pair of leaves occasionally quite a distance below the top, flat and horizontally spreading over the ground surface, membranous and soft in texture, velvety dark green above, much paler or sometimes with a metalic hue beneath, opposite, drying very unequally brown on its two surfaces, the pairs very unequal in size, all greatly varying in size and shape, entire, upper face glabrous except along the midrib, lower face glabrate except the midrib and nerves, the lamina portion of the largest one 3 by 7 cm, most of them considerably smaller, the smallest blades barely longer than 1 cm and ovate in shape, the others oblong to subelliptic, sometimes broadly lanceolate in shape and acute at the apex, otherwise obtuse to rounded, base inequilateral or equilateral and short cuneate to obtuse, sometimes appearing subtruncate; midrib quite conspicuous beneath; nerves 5 to 9 on the average leaves, fewer on the smaller ones, divaricate but regularly curved upwards, rather faint, puberulent beneath, reticulations obsolete; petioles strict, from 5 mm to 2 cm long, scurfily pubescent, divaricate. Inflorescence terminal or from the uppermost leaf axils, atropurpureous tinged, upon 3 to 9 mm long erect peduncles, cymosely or rather scirpoidly short branched at the top, yellowish brown tomentose; the florets secundly arranged along the upper side, sessile, closely set; calyx barrel-shaped, 1.5 mm long, terminated by 5 erect teeth, ciliate on the outside; corolla 3 mm long, dingy white, broadly tubular, puberulent except the glabrous base, more or less constricted 1 mm from the base, its lobes short and blunt and appearing closed; stamens also 5, included, glabrous; filaments curved and free for about 1.25 mm, inserted upon the shoulder of the corolla constriction, otherwise adnate; anthers linear, 1.25 mm long, bilobed at the basifixed base; style crooked, glabrous, the elongated stigma finely ciliate. Capsules upon short distinct pedicels 2 mm long, crisply pubescent, 2.5 mm by 7 mm wide, straight and truncate across the wings, dehiscing along the entire length of the top, calyx teeth mere vestiges; seeds numerous, quadrangular, less than 0.5 or only 0.25 mm across, smooth, yellowish brown, each with a darker colored ring; the 2 columnar placentae persistent.

Type specimen number 16345, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June 1916.

Rarely found in or along trails of wooded ridges at 1000 feet above sea level.—In comparison with *Ophiorrhiza macgregorii Merr.*, our plant is pubescent with yellowish brown hairs, not reddish brown puberulent; capsules covered with crisp hairs, not subglabrous. Our largest leaves are 2 cm longer than those on his type, and are oblong in shape rather than ovate. This plant, with *Merrill's* species and *Ophiorrhiza pubescens Elm.*, including the specimen from Mati have very much the *Argostemma* habit of growth.

Ophiorrhiza ciliata Elm. n. sp.

Erect and terrestrial annual herbs. Stems few clustered, dull yellowish when dry, usually decumbent at the base and provided with profuse roots, erect or nearly erect, 1 to 3 dm long, obscurely curved, the upper or younger portions crisply pubescent, these dirty brown hairs wear off and then the lower portion of the stem appears glabrous, only occasionally short rebranched. Leaves chiefly opposite, scattered mainly toward the top, once in a while a leaf persists along the lower portion of the stems, subflaccid, much paler green beneath, thinly membranous, curing very unequal in color on the two sides, the lower face yellowish brown, entire, glabrate on both sides except the midrib and nerves beneath, often anisophyllous, oblong but sometimes broadly lanceolate, apex acute to obtuse or rounded on the smaller leaves, the lower half of the lamina inequilateral, base subcuneate to obtuse or even acute on the smallest ones, the biggest ones 2.5 cm wide and 9 cm long without the petioles, the average ones 2 by 6 cm, the little ones barely more than 1 cm in length; petioles slender, from 5 to 22 mm long, crisply ciliate along the lower side, yellowish in the dry state; midrib dull yellow and crisply pubescent beneath, shallowly caniculate and glabrate above, usually a trifle curved in the larger leaves; nerves as many as a dozen on a side, usually 7 to 9 or even fewer, ascending and with tips curved, subparallel, comparatively faint; reticulations more evident on the upper surface, appearing quite veiny in the fresh state. Inflorescence 1 to 3 cm across, light green, terminal, upon 5 to 15 mm long subglabrous peduncles or with few crisp hairs, much exceeded by the leaves, occasionally the flower cluster terminates an aphyllous stem; florets few clustered upon very short compressed branchlets, surrounded by a whorl of linear lanceolate involucral bracts which in the early stage closely enclose the young flowers in the head; bracts 2 cm long, with a stout midrib, its sides glabrate and conspicuously reticulate, yellowish brown when dry, margins provided with long numerously septated ciliate hairs; the individual flower short stipitate, usually subtended by a whorl of 3 bracteoles; these bracteoles are narrower and shorter, less ciliate or ciliae wanting toward the base; calyx hairy, 3 mm long, widely bulged or top-shaped, the upper half dissected into 4 or 5 very sharply pointed teeth, with a stout keel and with similar ciliate bristles; corolla nearly white, 4 mm long, broadly tubular, subinflated toward the base, glabrous except for the hyaline hairs on the back side of the 5 oblong segments and the circle of fine hairs just below the throat; stamens 5, the free 0.5 mm filaments adnate to the basal portion of the tube; anther linear, 1 mm long, bifid and basifixed; style with a broadened appendage from its base, the linear stigmatic portion puberulent, cleft at the apex. Capsule 3 by 7 mm, pubescent except the outer wing margins and along the truncate margin, calyx teeth apiculate; the 2 linear placentae persistent; seeds very many, quadrangular, 0.25 mm across, dull brown.

Type specimen number 17544, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Gathered along the trail of the mountain at medium altitude and it was the only plant observed on this excursion. — The alliance of this species is with *Ophiorrhiza involucrata Elm.*, and is at once differentiated by its linear involucral bracts and the ciliate hairs throughout the inflorescence. We have only these two species of *Ophiorrhiza* with involucres, and as early as in 1907 I collected the first in this group at Lucban as a plant with woody basal stems, while our present species is an annual herb.

Ophiorrhiza inaequifolia Elm. n. sp.

Terrestial annual to biennial. Stems many, mostly erect, seldom branched, terete toward the base, from 3 to 14 cm long or high, usually in small groups of a large mass or colony, the upper portion quite slender, ferruginous puberulent or pubescent, toward the base more or less covered with ground colored scurf, leaf bearing mostly toward the top. Leaves in opposite pairs, subequal but occasionally very unequal in size, sometimes they persist on the stem toward the base or below the middle, flat, ascending, submembranous, entire, curing whitish beneath, glabrous on both sides except the midrib and nerves beneath, ovate to ovately oblong or simply oblong, the laminae varying from 1 to 6 cm long, less than 2 cm wide at or below the middle, apex bluntly acute to broadly obtuse, base occasionally a trifle inequilateral, subcuneate to obtuse or at the bases of the smaller leaves broadly rounded; petioles relatively short, less than 1 cm in length, tawny puberulent or finely pubescent; midrib tawny puberulent beneath only; nerves similar in color and puberulence, 5 to 8 on each side of the midrib, divaricate but ascendingly curved toward their ends; reticulations visible with a lens. Inflorescence erect, at most 2 cm long by 1 cm wide across the top, from the upper leaf axils or terminal, brown puberulent, with few short branches, not scirpoid; the peduncle up to 1 cm in length, often provided with a pair of foliaceous bracts toward the base; flowers few to severally clustered, erect, upon few mm long much compressed pedicels; calyx somewhat flattened, not pubescent, top-shaped or bulging across the middle from the side view, carinate or keeled, 2 mm long including the small apiculate teeth; corolla whitish, tubular, reaching 4 mm in length, glabrous on the exterior as well as on the interior, widened toward the top; lobes or segments linearly oblong, erect, not spreading or reflexed; stamens 5, the 1 mm long free filaments adnate to the basal portion of the corolla tube; anthers linear, as long as the free filaments, bifid at the base and basifixed, extended to the throat of the corolla; style slender, the narrowly lance-shaped stigmatic portion exceeding the anthers. Capsule 2 by 6 mm, upon longer flattened pedicels than those of the flowers, truncate, minutely puberulent or glabrate when old except the short winged ends, double cushion-shaped; seeds numerously crowded or packed around the 2 placentae, light brown, quadrangular, 0.25 mm wide and long; reticulations of the carpels obsolete.

Type specimen number 17820, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Found growing in masses upon clayey soil of very wet densely wooded and moss laden depressions along the trail near the summit region. — Similar to a number of Philippine *Ophiorrhiza* species, but most closely related to *Ophiorrhiza ovata Merr.* which however is a more glabrous plant, especially in its smooth inflorescence. Our peduncles, inflorescent branches and pedicels are much shorter, thicker and pubescent.

Ophiorrhiza maquilingensis Elm. n. sp.

Delicate terrestrial annuals. Stems numerous, erect or ascending, the under ground portion decumbent and fibrously rooted, branched from the base to the middle of the stem or from near the top, all the way from a few to 10 cm in length, thin, herbaceous, the upper or younger portion reddish brown ciliate, toward the base more scurfy than pubescent and ground colored, becoming glabrate; branches ascending, similar in vestiture. Leaves very thin or subflaccid, mostly from the top and along the stems, mainly opposite although single leaves are quite persistent, very unequal in size, ascending or horizontal, flat, velvety dark green above except the whitish zone along the midrib and along the nerves, olivaceous green in the dry state, glaucous white beneath, equilateral, glabrous on both sides except the midrib and nerves on the nether surface, ovate to elliptic, with rounded apex, largest blades 8 mm wide below or at the middle, 14 mm long, most of them 6 by 10 mm in dimension, the smallest ones 3 to 5 mm; midrib conspicuous beneath toward the base, usually scurf-covered but which easily wears off with age, minutely caniculate above; nerves 3 to 5 on each side, arcuate, glabrous or covered with fine deciduous ground colored scales; reticulations obsolete; petioles filiform, strict, longest one 1 cm in length but many much shorter, in the early stages covered with a dull or yellowish brown mixture of scales and hairs especially along the lower side. My field-note reads inflorescence dull purple except the white corollas. Infrutescence terminal and from the uppermost leaf axils, erect; fruits 1 to 3 upon stout 3 to 5 mm long pedicels; the flattened pedicels are densely covered with reddish brown hairs; capsules compressed and double cushion-like, 3 by 6 to 7 mm, apex truncate, more or less pubescent all over, in age almost glabrate and the veins of the carpels appearing alveolate, the calyx segments remaining as vestiges, widely opening along the entire length of the capsule; each of the 2 cells with a linearly lanceolate flat placenta and which long persists after the seeds have all dispersed, the septum membranous; seeds quadrangular, yellowish brown, 0.25 to 0.5 mm across.

Type specimen number 17536, *A. D. E. Elmer*, Los Banos (Mt. Maquiling), Province of Laguna, Luzon, June to July 1917.

Discovered this small species among other fine herbaceous ground plants in the higher or alpine woods of the mountain.—*Ophiorrhiza biflora Elm.* from Mt. Apo has a prostrate or creeping habit as that of *Ophiorrhiza tenuis Merr.*, while our species forms tuftlets or small clusters with erect stems. From the former, its nearest relative, our species differs in having larger leaves with rounded not acute apices, whiter beneath in the dry specimens, and ovate to subelliptic rather than broadly lanceolate to oblong in shape.

Ophiorrhiza sorsogonensis Elm. n. sp.

Annual ground plants. Stems reclining or decumbent toward the base, subterraneously creeping and rooted at the joints, up to 15 cm long above ground, weak and usually curved, occasionally branched, covered with blackish brown scales which seem to rub off toward the base, the young apical portion more pubescent than scurfy. Leaves fairly well scattered but mainly toward the top, anisophyllous, opposite, the lower ones falling at different times, making the persistent leaf appear as single or solitary, greatly varying in size, lance-shaped to broadly lancolate, apex mostly obtuse or sometimes acute, base obtuse to short cuneate, glabrous except the midrib and nerves beneath, its upper and lower sides very unequal in color when dry, grayish white beneath, the larger laminae 1 cm wide below the middle, 2 to 3 cm in length, the smallest blades shorter and much narrower; midrib mostly covered with yellowish or coffee brown scales and appearing rather prominent on the nether surface; nerves ascendingly curved especially toward their tips, pulverulent, 4 on each side, only 2 or 3 in the smaller blades, never as many as 5 to 7; reticulations none; petioles from 5 to 15 mm long, straight, mainly covered with ground colored scales which early wear off. Infrutescence very short, erect from the uppermost leaf axils, dark brown pubescent, solitary or few clustered only; peduncle or pedicels expanded toward the top, usually at the base subtended by foliaceous bracts, crisply short pubescent; capsules 3 by 8 mm, similar in vestiture, truncate, flattened, the winged end portion without seeds, the middle portion cushion-shaped and bilobed, 2-celled, the calyx segments apiculate, in some capsules as many as 8 points were counted; placentae 2, narrowly lanceolate, upon a very short but distinct base; seeds crowded toward the middle portion of the carpels, irregular but mainly quadrangular in shape, 0.25 to 0.35 mm wide from the side view, the center marked with darker brown spots or very short lines.

Type specimen number 17135, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Gathered among mosses, scale-mosses, *Elatostema* species and other herbaceous vegetation in the high alpine region of Bulusan volcano. — Inflorescence or infrutescence quite like that of *Ophiorrhiza curtiflora* Elm., but leaves only half as wide and much shorter, nerves only 4 not 5 to 7 on each side, broadly lanceolate with obtuse tips, not oblong with acuminate tips. Vestiture in ours is scurfy rather than pubescent. It is more distantly related to *Ophiorrhiza caespitulosa Elm.*

Plectronia amplifolia Elm. n. sp.

A shrub or small tree. Branches terete, smooth, yellowish gray; twigs opposite or when terminal 3-clustered, smooth, greenish when fresh, drying substramineous in color, subterete or angular at the joints, the upper internodes flat and grooved on its sides, glabrous, rather thin and slender. Leaves opposite, glabrous, blackish brown above and straw brown or gray beneath on the dry specimens, entire, rotund to broadly elliptic or the smaller basal ones obovate, apex rounded but with a very short and blunt point, the larger blades 7 by 12 cm including the short petioles, the medium-sized ones 5 by 9 cm, widest across the middle except the smallest leaves, base broad and very short or bluntly cuneate, the sides of the lamina decurrent into the stout 5 mm long petioles; midrib ridged beneath, slightly channelled above; nerves 4 on each side, ascending, their tips much curved upwardly and disappearing; reticulations none; interaxillary bracts or stipules short cup-shaped, thick or rigid, with a pronounced spine-like point. Infrutescence axillary, widely spreading, glabrous; peduncle slender, 1 cm long or shorter, bearing an umbellate cluster of fruits; pedicels scattering, those on the drupes 5 mm long, shorter in the flowers, subtended by a whorl of thick and relatively short bracts; young fruits with a shallow rim-like cup with 4 or 5 apiculations at the top; mature drupes 5 mm high and 8 mm wide in the dry state, didymous, broadly notched or impressed at the apex, creased along its sides, with 2 seeds; pyrene bony, plane on its ventral side, otherwise coarsely rugose.

Type specimen number 16739, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, July 1916.

Collected along stream beds in the woods of the foot-hills at low altitude. — Apparently related to but distinct from *Plectronia sessilifolia Merr.* and *Canthium oblongifolium Quis.* and *Merr.* It is the same as Bureau of Science number 21624.

Psychotria cuneata Elm. n. sp.

An erect shrub. Branches terete, crooked, quite slender, the smooth old bark dark gray to brown mottled; the dry twigs slender and straight, covered with a short but densely dull ferruginous pubescence, mainly in pairs, subterete or the upper younger portion somewhat compressed especially toward the nodes, the internodes slightly grooved longitudinally along its sides. Leaves well scattered in opposite pairs, submembranous, ascending or horizontal, flat, entire, obovately oblong, cuneate at the base, sharply acute to acuminate at the apex, the average blades 3 cm wide above the middle and 7 cm long, sometimes much smaller ones interspersed and which are oblanceolate in shape, much paler green beneath when fresh, curing reddish brown on the lower face and nearly black or blackish brown on the upper side, glabrous except along the midrib beneath; petiole thin, 5 to 10 mm in length, very dark brown pubescent along the lower and lateral sides; midrib prominent, darker in color, similarly pubescent, the upper side flat and glabrous; nerves glabrate, 6 to 8 on each side, relatively faint, subdivaricate and subparallel, tips faintly interarching; reticulations closely messed, visible from both sides; interaxillary stipules 6 mm long, rigid, glabrous, broad, clasping, caducous. Inflorescence in axillary bud-like clusters, 5 to 8 mm long surrounded by a whorl of bracts or involucre; bracts greatly varying in size, broad, more or less united at the base, short pubescent, the inner ones much smaller, the outer ones glabrate toward the top; flowers several, pedicelled; calyx short turbinate, truncate and usually with apiculate segments; corolla obovoid, valvate, the short basal portion narrowly tubular, finely pubescent on the inside in the region of the anthers; filaments adnate to the base of the corolla tube, otherwise free; anthers 0.5 mm long, elliptic, basifixed; style thick, bearing a forked stigma. Fruit pedicel slender, 5 mm long, glabrous; drupes obovoid, as long or longer than its stalks, ridged, obscurely compressed, 2-celled and with 2 seeds; pyrenes plane on the inner side, otherwise 3-ridged, pointed at the base, rounded at the apex.

Type specimen number 17170, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Collected in woody ravines at medium altitudes. — From *Psychotria longipedicellata Elm.* our specimens are distinguished by their cuneate, not abruptly rounded leaf bases, and by the sharply acute to acuminate tips. Our leaves are scattered, not terminally crowded in subwhorls.

Pyschotria irosinensis Elm. n. sp.

Erect and shrubby. Stems laxly rebranched; twigs terete, the young apical portion glabrous and obscurely flattened. Leaves submembranous, opposite, erect or mainly ascending, flat, apparently much lighter green beneath when fresh, grayish beneath when dry, subolivaceous on the upper surface except the whitish midrib and nerves, broadly oblanceolate in outline, the entire margins appearing minutely involute, glabrous on both sides but with minute black dots on the upper side, apex acute, gradually and slenderly tapering from the middle to the short petiole, 5 by 16 cm in size, widest above the middle; midrib pronounced beneath and blackish brown, grayish white on its plane upper side of the blade, smooth and glabrous; nerves also grayish white on the upper leaf surface, beneath conspicuous and dull brown, oblique, their tips forming a submarginal vein, 8 to 10 on each half of the leaf, the basal ones quite short but straight, the reticulations not evident from either surface; petiole blackish, glabrous, 5 to 10 mm long, stout, flattened, leaving large nearly circular scars after falling; stipules between the petioles composed of a very shallow reddish brown rim whose inner marginal side is short but densely hairy and of the same color. Infrutescence terminal and between the terminal pair of leaves, upon a very short and thick peduncle or subsessile; the fruit bearing stalks or peduncles proper are glabrous, subterete and pale green, black and appearing somewhat angled in the dry state, few to several, divaricately spreading, 1 to 2 cm in length, bearing a cluster of sessile fruits at its distal somewhat enlarged end; drupes few to several, sessile, subtended by short and unequal glabrate bracts, spreading, at the apex crowned by the 5 acute and persistent calyx teeth, 9 mm in length, one half as wide across the middle in the dry state, about 10-carinate or sulcate, a trifle more pointed toward the base, one seed in each half; pyrene nearly flat on the inner side, 5-ridged otherwise, stone hard.

Type specimen number 17356, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Gathered among the undershrubs of woods at about 100 feet above sea level.—From *Psychotria manillensis Bartl.* it is separated by its more numerously nerved grayish to subolivaceous, not reddish brown, leaves; and by its unbranched infrutescence. From *Psychotria pallidifolia Merr.* our species differs in having thinner leaves which are entirely devoid of conspicuous reticulations; fruits upon unbranched peduncles, ellipsoid to fusiform, not obovoidly globose.

Psychotria sorsogonensis Elm. n. sp.

A coarse shrub or small tree. Branches terete, 7 to 10 mm thick, conspicuously marked by the leaf scars, covered with smooth gray bark; wood quite tough; twigs or the terminal branchlets pale green when fresh, glabrous, relatively short, ascendingly curved, prominently compressed, terminated by an inflorescence and a pair of opposite twigs. Leaves opposite, flat, spreading, chiefly in a few terminal pairs, also glabrous, mostly obovate, sometimes subelliptic, the average size 7 by 15 cm, occasionally the lower leaves only 3 by 7 cm, widest above the middle or only seldom across the middle, apex broadly rounded with a short blunt point, base cuneate, thickly coriaceous, entire, curing similarly brown on both sides; petiole short and very thick, up to 1 cm in length, flattened, circularly expanded at the base and leaving prominent scars after falling; midrib ridged or raised beneath, stout, flat above; nerves 7 to 10 on each half of the leaf, subdivaricate and subparallel, slightly curved upwardly except the fine tips which are faintly interarching, more evident from the lower side, reticulations obsolete or nearly so; interaxillary bracts or stipules thick and leathery, up to 1 cm long, broadly oblong or ovately oblong, involute, glabrous except the rugose inner basal portions which are finely reddish brown ciliate. Peduncle suberect, 5 cm long on my specimen, glabrous as is the entire infrutescence; branches corymbose or paniculate, 5 cm high and 8 cm wide or higher than wide, all branches subtended by short and broad coriaceous persistent bracts, the upper bracteoles much smaller; branchlets divaricately spreading, sometimes terminated by a subsessile fruit, usually ending with a pair of opposite pedicels which are about 3.5 mm long; drupes 6 mm long in the dry state, nearly as wide, considerably larger when fresh, subglobose or short obovoid, black on the specimen, sharply carinate, apex rounded and without calyx segments, more tapering toward the base; pyrenes 2, plane on the inner face, otherwise carinate, more pointed at the base.

Type specimen number 16772, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, July 1916.

Discovered in rather dry soil among other undershrubs of deeply shaded forests at 2000 feet altitude.—Similar to a dozen of our endemic species of *Psychotria*, but most closely allied to *Psychotria palawanensis Elm.*, from which it differs in its long peduncle, sharply carinate instead of rugulose drupes and other minor characters. Its leaves, however, are quite similar to *Psychotria arborescence Elm.*, except with much shorter petioles; infrutescence more branched, the carinate, not smooth, drupes are upon distinct pedicels, not sessilely clustered from the ends of thickened stalks or branchlets.

Pyschotria vulcanica Elm. n. sp.

A liana-like climber. Stem 3 to 5 cm thick, repeatedly branched, crooked, subterete, the numerous branchlets forming tangled masses which are usually toward the top of large trees 10 m above ground; wood sappy white, porous, thick, covered with smooth and mottled bark; twigs glabrous, dark green or yellowish green, long and slender, much curved, suberect toward the inflorescence, otherwise terete, smooth, a few mm thick. Leaves opposite, evenly scattered along the twigs or branchlets, submembranous, shallowly folded and with tips recurved, a trifle paler beneath in the fresh state, curing dull brown on both sides, entire and glabrous, 5 to 7 cm long without the petiole, 2 to 3 cm wide at the middle, often smaller, rather abruptly acute to acuminate, base mainly obtuse, short oblong to oblong elliptic, the smaller ones broadly lance to oblanceolate in shape; midrib deeper brown beneath, caniculate above especially toward the base; nerves 4 to 6 on each side, oblique and straight, tips obscurely united, reticulations obsolete or nearly so; petioles thin, from 5 to 10 mm long, wholly glabrous; stipules or interaxillary bracts 3 to 5 mm long more or less, subtruncate, glabrous, thick, reddish brown, caducous. Inflorescence and infrutescence terminal, ascending, paniculate and pale white, upon a 5 to 8 cm long peduncle, the branched portion 14 cm long, fully as wide, glabrous; main branchlets in opposite pairs, almost at right angles from the main axis, smooth and slender, the lower or longest ones 10 cm long, numerously rebranched from above the middle, the ultimate branchlets slender and straight, all main branches subtended by shallow cup-shaped bracts, the upper bracteoles mere rings with minutely ciliated edges; pedicels up to 3 mm long, subtended by very small or apiculate teeth-like bracteoles; calyx turbinate, green, 1.5 mm long, truncate and with 4 minute calyx teeth; corolla tubular, 5 mm long including the 4 reflexed and triangularly oblong segments, glabrous except the throat region within; stamens alternating with the corolla tube, the 1 mm long free and glabrous filament exerted and adnate to the corolla tube; anthers yellow, narrowly oblong, 1 mm in length, basifixed. Drupes chalky white when fresh, narrowly ellipsoid, 5 mm long, 3 mm thick at the middle, smooth, its halves obscurely creased longitudinally, otherwise terete, dull brown when dry, at the apex constricted and with an apiculate calyx rim which is thick and nearly black in color; pyrenes 2 or by abortion solitary, plane on the inner face, convex otherwise.

Type specimen numbers 16564 in flower and 14431 in fruit, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915 for the latter and July 1916 for the former number.

Discovered this large woody vine or liana climbing upon forest trees of the foot-hills or at about 500 feet altitude.—This same species the author has also collected in the lower forested region of Mt. Maquiling. It can easily be keyed out from *Psychotria diffusa Merr.*, and from all its alliances which is getting to represent a rather critical group. The type of *Merrill's* species is 162 *Whitford* from Mt. Mariveles and is in fower, while *Whitford* 930 from Mt. Banahao is exactly the same species in fruit.

Randia alveolata Elm. n. sp.

A large woody climber or liana. Stem 1 to 1.5 dm thick near the ground, 10 to 15 m long or high, crooked, branched at the top; wood soft, bitterish and with a bad odor, whitish, porous; bark blackish brown, coarsely lenticelled or excrescent, thick, testaceous except the epidermis; branchlets hanging in masses, smooth and gray or yellowish gray; twigs terete, the younger or apical portion compressed, murinous colored when dry, smooth and glabrous. Leaves well scattered in opposite pairs, also glabrous, the entire margins subinvolute, subcoriaceous or submembranous, descending, spreading at right angles to the branchlet, slightly darker green upon the somewhat folded upper surface, the sides coarsely wavy except toward the obtuse to rounded base which is sometimes slightly inequilateral, gradually tapering to the acute or subacuminate apex, the average laminae 3 cm wide by 1 dm long but most of them smaller, curing grayish brown on both sides, the smaller blades broadly lanceolate, the larger leaves lanceolately oblong; midrib ridged beneath and deeply grooved above, very dark or dull brown or nearly black on the dry specimens; nerves 5 to 7 on each side of the midrib, ascending, tips upwardly curved and disappearing, quite conspicuous and similar in color beneath, reticulations none; petiole glabrous, from 5 to 10 mm in length; stipule a 2 mm long boot-like rim, glabrous and reddish brown, rigid, the middle extended into a 1.5 mm long point, deciduous. Cymose inflorescence green except the flowers, 3 to 9 mm long subaxillary, glabrous in all its parts, 2 to 3 cm across, branched from near the base, rigid, the final branches often recurved, the branchlets subtended by saucer-like bracts, the pedicels subtended by a pair of persistent short and broad bracteoles which are minutely ciliate along its edges; pedicels 3 to 5 mm long, strict, leaving a ring-like scar after falling; calyx a trifle shorter, turbinate, truncate, with a broad thick rim; corolla 9 mm long, the basal tubular portion 4 mm and the lobes 5 mm, densely reddish brown pubescent at the throat; lobes or segments normally 5, strongly reflexed, much imbricated and twisted in the bud state, rather thick and rigid, oblong, glabrous on both sides; stamens as many and inserted upon the throat, alternating with the lobes, upon very short filaments; anthers linear, auriculate at the base, basifixed, pointed at the apex, the inner face with double rows of pits or alveolate along each side, 5 mm long or longer, subpersistent and becoming recurved in the advanced stage of anthesis, light stramineous on the pitted surface, the dorsal side reddish brown even in the dry state; pistil at least 1 cm long, its style glabrous, bearing an elongated clavate stigma which finally becomes divided, the inner surface of these lobes plane and the outer surface striate, subpersistent. Drupes in the dry state 5 mm in diameter, subglobose, smooth; seeds about 4, relatively large, attached to a fleshy central placenta, flat on the inner two sides, convex on the outside portion.

Type specimen number 16050, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, March to August 1916.

Discovered as a large tree climber in the forests along a ridge at 1000 feet elevation.—It is a very close relative to *Randia bakeri Merr.*, but our leaves are thinner in texture, shorter and narrower, with equilateral or only slightly inequilateral bases; midrib and nerves very dark brown, not light or yellowish brown. Mature fruits and flowers of both species will reveal additional characterizations. This number was distributed under a meaningless name.

Randia purpuricarpa Elm. n. sp.

An erect undershrub or a little tree. Stem 2 to 3 cm thick, terete, reaching 3 m in height, branched toward the top; wood rather soft, sappy white, with a relatively large brown colored pith, covered with testaceous and longitudinally checked bark; main branches numerously and slenderly rebranched, the lower or longer ones sparingly rebranched; branchlets lax, divaricate, green but upon drying turning murinous or nearly black, many, glabrous, the ultimate portion are very thin and usually flattened toward the joints or at the leaf attachments. Leaves thinly coriaceous, horizontal and with recurved tips, divaricately spreading, paler beneath, curing unequally on its two sides, brown beneath, murinous above, margins conspicuously rugose of the larger ones, evenly scattered along all twigs and branchlets, opposite, the basal or larger leaves oblong, the numerous upper or smaller ones narrowly oblong to lance-shaped, the former 5 by 11 cm in size, the latter varying from 1 to 2 cm wide and 5 to 8 cm long, apex slenderly acuminate to subcaudate, base broadly obtuse to rounded, widest below the middle, occasionally somewhat falcate toward their tips; midrib prominent beneath, glabrous; nerves obscure, 5 to 7 on each half of the lamina, ascending and tips more or less interarched; reticulations barely visible; petiole short on the large leaves, thin and up to 5 mm in length; stipules between the leaves with a broad base and setaceously pointed, 5 mm long, rigid, also glabrous. Inflorescence superaxillary, glabrous; peduncle gracilis, ascending, strict, usually in opposite pairs, from 1 to 2 cm in length, bearing at or toward the apex 1 or 2 flowers or fruits; pedicels short, subtended by a pair of setaceously lance-shaped bracts which are suboppositely placed; flowers descending, whitish; calyx glabrous, at least 5 mm long, tubularly elongated, tapering at the base into the pedicel, slightly thinner just below the calyx teeth; segments 4, sharply pointed, appearing finely ciliate on its inner basal portion; corolla 5 mm long, with a short rather thick tube, its throat bearded; segments probably 4, about 3 mm long, prominently pointed; anthers quite narrow, gradually pointed, recurved with age, alternating with the corolla lobes and subsessilely inserted upon the throat. Drupes pendant, when young pale green and actually ridged, shining purple when mature, fusiformly ellipsoid, longitudinally 8-costate and sided, at least 1.5 cm long, 5 to 8 mm thick across the midde or below it, mostly obtuse at the base, abruptly terminating into a short, stout beak which is conspicuously sulcate; meat white, juicy and sweet; seeds 6 more or less, irregularly compressed and short lanceolate, pointed at one end and rostrate at the other, reddish brown, finely ruminate.

Type specimen numbers 16598 and 15511, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, July 1916 and November 1915 respectively.

Gathered in stony and humus covered ground on steep slopes of a deeply wooded ravine at 1250 feet elevation.—The fruit resembles *Randia rostrata Merr.*, but foliage distinct. It also resembles *Randia loheri Merr.*, but there are notable differences in leaves, flowers and fruit characters. It may more properly belong to the genus *Hypobathrum*, but hardly *Hypobathrum purpureum* (*Elm.*) *Merr.*

Tricalysia sorsogonensis Elm. n. sp.

A shrub or tree-like in stature. Branches crooked, similarly rebranched, terete except the flattened apical portions, dull brown when dry, the glabrous twigs yellowish in the dry state. Leaves chiefly along the quite short and young branchlets, opposite, not crowded, subcoriaceous, likewise glabrous, ascending or horizontally spreading, nearly flat, curing light yelowish brown beneath and dull brown above, entire, oblong, the largest lamina 5 by 12 cm, most of them 3 by 9 cm, occasionally very small ones interspersed, obtuse to acute or sometimes rounded at the base which only seldom appears a trifle inequilateral, apex acute or subacuminate; midrib prominent and similarly yellowish brown; nerves on the average blades 4 or 5 on each side, obscure but equally evident from both sides, their tips strongly arched toward the apex and disappearing; reticulations even more obscure, more evident on the upper side; petioles from 5 to 10 mm long, glabrous, yellowish brown, caniculate along the upper side; interaxillary bracts gradually tapering from a broadened base to a sharp point, erect, only about 2 to 3 mm long. Inflorescence fasciculate in the leaf axils and which point usually enlarges in the development of the fruits. Infrutescence crowded in the fallen leaf axils or in the mature state appearing lateral from the branchlets; fruits upon very short and slender pedicels, ellipsoid, nearly 2 cm long by 1.5 cm wide or thick across the middle, hard at least in my dried specimens, surface appearing finely rugose or scurfy and minutely punctate, apex with a circular scar, its pericarp thick, about 6-seeded more or less; seeds irregularly placed about a thin septum or placenta, quite irregular in shape but mainly flat, rounded or angular from the side view, 5 mm across or less, reddish brown, their inner surfaces strigulose or falsely ruminate, the outside or convex sides smooth.

Type specimen number 17261, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Found in woods at medium or lower altitudes of Mt. Bulusan.—It approximates the common *Tricalysia fasciculiflora* (*Elm.*) *Merr.*, but our fruits are two to three times as large, ellipsoid in shape, with only half as many seeds which naturally are much larger in size. My number 17164 from this same locality was distributed under this new name, but which has fruits similar to *Tricalysia fasciculiflora oblongifolia Merr.*

Uncaria brevicarpa Elm. n. sp.

A climbing and rambling shrub. Stem near the ground 12 to 15 cm thick, terete, occasionally branched at right angles, heavy and bendable; wood porous, the sapwood brownish, the greater central mass sulphureous in color; bark relatively thick, badious except the yellowish gray more or less longitudinally checked epidermis; branches long and rebranched, the larger portion subterete, the terminal portion reddish brown pubescent or ciliate, dull brown when dry, the twigs obscurely quadrangular. Leaves widely scattered, opposite, much lighter green beneath, horizontal or descending, flat, curing very unequally brown on their two sides, membranous to submembranous, ovately rotund or subelliptic, abruptly terminated into a sharply acute to acuminate point, base rounded but not cordate, 12 cm long by 7 cm wide more or less, entire, margins ciliate, rufous brown ciliate on both sides but especially on the nether side; midrib raised beneath, densely rufous, narrowly caniculate along the upper surface; nerves 4 to 6 on each half of the blade, similarly pubescent and caniculate above, ascendingly curved especially toward their tips; cross bars quite evident on the lower surface only, with light colored setose hairs; reticulations minute, also ciliate; petioles about 5 mm long, clothed with rusty brown hairs, usually curved from the base; the hooks from the leaf axils extend backwards and are strongly inwardly curved toward their sharp distal end, flattened at the base, stout and persistent, becoming glabrate with age except toward their tips; stipules forming a rosette of ovately oblong bracts; bracts unequal in size, averaging 1 cm long, ovately oblong, deflexed, ciiate and sparsely pubescent on the dorsal sides, subglabrous otherwise, membranous, brown when dry. Infrutescence often upon specialized branchlets which are setaceously pubescent when young but with age becoming scabrid; heads often subtended by stipular-like bracteoles, from the fallen leaf axils, subglobose, 2 to 3 cm in diameter, pedunculate; stalk 1 to 1.5 cm long, very stout, at right angles to the rachis, flattened toward the base, covered by reddish brown setose hairs; carpels subsessile, the endocarp bony, at the base subtended by grayish white bristle-like hairs, in the young state sparsely setose, when old subglabrous, obovately elongated, obscurely ridged or merely striate, 9 mm long without the calyx, one third as wide above the middle, 2-celled, dehiscing into halves and along the central line; calyx of the smaller carpels 5 mm long, 5-segmented, linearly lance-shaped from the base but setaceously pointed toward the apex which bears few but long setose hairs, breaking off in the older fruits or carpels; seeds many, 2.5 mm long including the diaphanous single or double pair of wings, the seed portion without wings 0.25 to 0.33 mm long, circular, brown, minutely pitted from the flat side view.

Type specimen number 16842, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, August 1916.

Discovered in wet compact humus covered soil along woodland streams at 1000 feet elevation and facing the Pacific Ocean.—From *Uncaria perrottetii (Rich.) Merr.* it is separated by its short sparsely ciliate carpels which are subsessile and form dense heads. Leaves are also different in shape and vestiture.

Uncaria bulusanensis Elm. n. sp.

A scandant woody vine. Stem 3 to 5 cm thick, terete, looping, bendable, occasionally rebranched, covered with smooth yellowish gray bark; main branches long, very tough, repeatedly branched, usually hanging in tangled masses; twigs green and angular, smooth, grayish brown on my dry specimens, mostly opposite, the rusty brown puberulent young or apical portion angularly compressed and grooved along its sides. Leaves well scattered in opposite pairs, submembranous or subchartaceous, curvingly complanate on the upper surface, subglaucous green beneath, the abruptly acute to subacuminate apex recurved, broadly obtuse to rounded at the base, the entire margins slightly involute, smooth and glabrous upon the upper dry brown surface, yellowish brown beneath, ovately elliptic to rotund, widely spreading horizontally or descending, 6 cm wide and 10 cm long more or less; midrib prominent and strigosely pubescent beneath, yellowish brown, impressed on the upper side; nerves 4 or 5 on each side of the midrib, conspicuous, oblique, tips reticulately united, pubescent; cross bars evident from beneath, reticulations obscure, all more or less puberulent; petioles 5 to 8 mm long, ferruginous in the early stages, flattened along the upper side, relatively thin; the uncinate hooks arising from the leaf axils, strongly recurved, 2 to 3 cm long when straightened, flat especially toward the base, usually provided with a whorl of bracts toward the rubiginous pubescent apex and which bracts are fugacious. Infrutescence mostly axillary or from the fallen leaf axils; peduncle divaricate, 2 to 3 cm long, articulate at the middle, densely ferruginous especially the apical portion, the lower half compressed especially toward the base; receptacle small, short reddish brown pubescent, not ciliate nor setose; heads 5 cm in diameter, globose or nearly so; carpels 1.5 to 2 cm long, linearly oblong, 5 mm thick, equally tapering at both ends, striate, with a short pubescens, splitting open in halves across the middle in the mature state but remaining in tact at the calyx crown, yellowish green but dull brown when dry, the endocarp cartilaginous; calyx persistent, densely tawny pubescent, widened toward the 5-toothed top; pedicels widely spreading, slender, grayish brown pubescent, 1 cm long or longer, at the base not surrounded by long hairs; seeds countless, 7 mm long from end to end of the hyaline and bristle-like wings, one end of the seeds with 2 bristles; the wingless seed elliptic from the compressed side view, papillate, 1.25 mm long, light brown.

Type specimen number 14917, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Gathered from trees thirty feet above the wet stony and gravelly ground, along a streamlet at 1500 feet above sea or ocean level. —It is at once recognized from *Uncaria longiflora* (*Poir.*) *Merr.* by its very short petioles, much thinner mature leaves whose nerves and midrib are pubescent beneath.

LEAFLETS OF PHILIPPINE BOTANY

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A CENTURY OF PHILIPPINE MELIACEAE

by

A. D. E. ELMER

Over 33 years ago, or to be more exact in December 1903, I began my collecting in this part of the world in what was then the "moat" of Manila, or what is now the sunken gardens.

Almost from the beginning of my exploration work in the Philippines I reserved my *Meliaceae* for *Dr. Casimir de Candolle* for determination, and from time to time have sent my first and best specimens to him. Up to the time of his death I had received no report from him. Since then I have tried to name my *Meliaceae* materials, and in the rush of other work, I have sent out many specimens with provisional new names.

As the title would indicate I have collected three species more than an even hundred, and my collections are represented by all of the eighteen genera so far known in our Archipelago. All are ligneous except one species of *Munronia* which is herbaceous. One or possibly two

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species of *Melia* are introduced as ornamental shrubs, and which are sometimes called the "Philippine Lilac"; one species of *Aglaia* is also introduced for its fragrant flowers. A species of *Sandoricum* is an introduced tree and bears the edible fruit called "Santol". Another tree under *Lansium* is indigenous and also bears edible fruits known as "Lansones". Most of the other woody plants of *Meliaceae* are small or medium sized trees, well scattered in the woods of the foothills and in the primaeval forests of higher altitudes. A number of the larger trees produce a second class. wood for general construction work. The genus *Toona*, produces a particularly fine grade of wood, commercially known as "Calantas" and is used in the manufacture of cigar boxes.

Most systematic botanists first think of *Meliaceae* as *Aglaia* and *Dysoxylum* species primarily, for they contain most of the species and are the most difficult to classify. Upon a second thought we remember the *Aphanamixis, Chisocheton, Amoora, Vavaea, Walsura* and for the rest of the genera,—well, we can forget them, for they contain only a species or two, never to bother us much.

As indicated before, the *Meliaceae* belongs to the virgin or primaeval forest vegetation in our islands, and in this the family presents a striking example of the novelty of our Philippines forest flora.

During all these years, botanists of the Bureau of Science have published many new species of *Meliaceae*, and yet in my own collections at this late date I find it necessary to describe and publish in this article 44 new ones. Previously I have published two new species of *Vavaea*, one of *Dysoxylum* and one of *Aphanamixis*, which, if added to what other botanist have published will give a very high percentage of endemism.

In as many as there were field-notes, I have reproduced them of representative specimens. I trust they will prove of some aid and furnish some more detailed information of the plants in the field.

List of the Genera and the Species.

AGLAIA Lour.

Aglaia affinis Merr.

Numbers 13945 and 15211 were distributed under the above specific name.

Field-note for 13945 from Cabadbaran, Mindanao, September 1912:—Small erect tree in damp humus covered soil of a densely wooded ridge at 3500 feet of Duros peak; stem 4 inches thick, terete, straight or somewhat crooked, 15 to 20 feet high, branched from the middle; wood white on the outside, the greater central mass reddish tinged, odorless and quite tasteless; bark smooth, brown toward the ground, otherwise grayish mottled, latericius except the epidermis; ultimate branches numerous, ascending; leaves similarly spreading or horizontal, recurved especially toward the apex, nearly flat on the upper dark green surface, yellowish green beneath; infructescence lateral, subpendant, upon flexible brown stalks 6 inches long or less, occasionally short branched; fruits 1 inch long, ellipsoidly globose, nearly ruber red. "Matambolog" in Manobo.

Aglaia agusanensis Elm. n. sp.

A small though erect tree; stem 1.5 dm thick, nearly 8 m high, subterete, crooked, branched from above the middle; wood quite hard, lead pencil odor, tasteless, its thin outer portion white, gradually changing to the latericius center, finely yet distinctly ringed; bark smooth, grayish to testaceus except the epidermis; main branches ascending, crookedly but sparingly rebranched, the ultimate ones slender and suberect; twigs thin or only 5 mm thick on my specimen, green but when dry gray except the deciduous rusty brown scales, subterete; leaves not numerous, 2.5 to 4 dm in length, those with only a single or a pair of leaflets shorter, the bijugate longer, well separated and alternate, ascending and horizontal; petiole 6 to 8 cm long on my specimens, greenish even in the dry state, very slender, usually somewhat curved, covered with a caducous bran like indumentum, subterete or angular, with an obscure canal along the upper side, enlarged at the base, ridged toward the upper end, plane on the upper face toward the base; rachis even more slender, longitudinally ridged or fluted along the upper surface, similar in color and vestiture to that of the petiole, nearly straight; petiolule from 5 to 20 mm long on my specimen, the basal one half much thickened, the lower and basal portion rugosely scurfy, the upper surface deeply channelled, also scale sprinkled; leaflets thinly coriaceous or submembranous, entire, flat, darker green on the upper glabrous side, relatively yellowish green on the lower likewise glabrous side, curing grayish brown above and avellaneus beneath, single or in nearly opposite pairs, the basal pair smaller and 6 by 12 cm, the terminal blades up to 3 dm long and 14 cm wide across the middle, varying ovately oblong for the smaller ones, elliptic to broadly lanceolate in outline, gradually tapering to the short acute apex, base subcuneate for the upper ones, otherwise obtuse to obtusely rounded for the lateral and lower laminae; midrib prominently ridged and flecked with rusty brown scales beneath, plane or shallowly grooved toward the base and glabrous on the upper surface; nerves 8 to 11 on a side according to size of leaflets, very evident from the upper side, distinct on the nether side, ascending, the ascendingly curved tips faintly interarching; reticulations obscure even on the lower surface; infructescence lateral or axillary, subpendant, 10 to 25 cm long, the fresh dark green stalks in my field note are described as flexible but those on my dry specimens appear quite rigid, 1 to 2 dm long; branches few, short, stout, all the stalks grayish brown and either glabrate or covered with the fugacious rusty brown colored scales; fruits obovoidly ellipsoid, 3 cm long, green but covered with an avellaneus bloom or indumentum which in the dry state is more nearly testaceus, irregularly or rather obscurely rugose, with 2 faint lateral ridges, set upon a very short and thick pedicel. "Lamboau" in Manobo.

Type specimen number 14028, collected by *A. D. E. Elmer* in damp stony soil of steep densely forested benches near the Catangan creek at 3000 feet altitude,—Cabadbaran, Agusan province, Mindanao, October 1912.

This is not *Aglaia diffusiflora Merr.* which is in flower and my specimens unfortunately in fruit only. Its affinity is rather with *Aglaia everettii Merr.* Our hard or solid fruits are obovoidly ellipsoid, longitudinally rugose or ridged, not pustulate, and are covered with a brown to avellaneus bloom. The leaves on our specimen are larger, more membranous, and their reticulation is obscure. No doubt flowering material will reveal other distinctive characters.

Aglaia aherniana Perk.

Number 17292 was distributed as *Aglaia irosinensis Elm.*, and number 12343 under the above specific name.

Neither of these contributions can be considered with *Aglaia llanosiana C.DC.*, *Aglaia turczaninowii C.DC.* and

Aglaia lepidota Merr., all of which may be one and the same species.

Field-note for 12343 from Magallanes, Sibuyan island, April 1910:—Slender or more or less a burly shrub like tree in moist red gravelly soil of wooded banks along the Pauala river at 1000 feet; stem 5 inches thick, crooked, 15 to 20 feet high, branched mainly towards the top; wood very hard, the thin sapwood white, otherwise deep reddish brown, without taste or odor; bark smooth, grayish white mottled; branches sparingly rebranched, the ultimate ones one half inch thick and with suberect tips; leaves heavy, crowded toward the end of the twigs, horizontal; petioles with thickened bases, leaving large oval scars; leaflets coriaceous, shallowly folded upon the upper darker green and sublucid surface, tips recurved, mostly ascending; panicle axillary, the stalks dull green, the small more or less rigid flowers lemon yellow and with a sweet parsley odor.

Aglaia antonii Elm. n. sp.

Small and slender erect shrubs or shrub like trees; stem terete, averaging 7.5 cm thick, 5 m high more or less, few branched toward the top only; wood hard, heavy, atropurpureus throughout, odorless and tasteless; bark nearly of the same color except the smooth grayish white surface; branches few, relatively short, ascending; twigs covered with a dull brown indumentum and sprinkled with lighter colored lenticels; leaves alternate, variable in size, nearly horizontally spreading; petiole 5 to 7 cm in length, subterete, shallowly grooved along the upper side, thickened at the base, ascending, covered with a dark brown stellular indumentum; rachis obscurely striate or angular, slender, covered with a similar pubescence; leaflets 4 to 7 on each side of the rachis, flat, horizontal or slightly descending, the abrupt and short acuminate tips strongly recurved, the basal portion involute or revolute, entire, dull green above and much lighter or even yellowish green beneath in the fresh state, coriaceous, light tan color above and purpureus beneath in the dry state, 3-foliate at the distal end, and other leaflets evenly scattered, either subopposite or alternate, the upper surface glabrous and minutely punctate, beneath obscurely covered with a grayish colored minutely ciliate scales, the largest ones 3 by 9 cm without the petiolules, the basal ones usually somewhat smaller, oblong in shape, the acute to obtusely rounded base obscurely inequilateral; midrib straight, stout, sunken above, the lower side densely covered with an olivaceus indumentum; nerves 7 to 10 on each half of the blade, ascending and tips interarching, obscure above, fine beneath but not prominent and covered with minute light gray colored scales; reticulations none but with a secondary nerve between the larger ones; petiolules 1 to 1.5 cm long, the terminal one 2 cm in length, barely thickened toward the base, terete, channelled along the upper side, with a fuligineus indumentum; inflorescence suberect, axillary, strictly paniculate, 3 dm long and 2.5 cm wide across the base, branched from the middle or from nearer the base, not rigid, ochraceus to luteus in anthesis; the short peduncle, rachis and lax branches all covered with olivaceus colored and ciliate scales; the main branches as well as the secondary branches subtended by short acute bracts covered on the outside with brown ciliate scales, the divaricate branchlets gradually becoming reduced, all alternate and equally floriferous from near the base; flowers subsessile, subtended by small narrowly acute to linear bracts covered with ciliate scales which are light olivaceus in color on my dry specimen; calyx densely covered with a latericius tomentum or stellate pubescent, 1.25 mm long, a trifle wider across the apex, stipitate at the base, the 5 teeth oblongish or rather acute; petals 5, free, 1.75 mm long, outer ones elliptically oblong, the inner ones obovately oblong, imbricate in the bud state; stamineal tube 1.25 mm long, erect, coriaceous, glabrous, 0.66 mm across toward the top, subclavate, obscurely 5-lobed at the apex, the lobed portion easily separating clear to the base; anthers also 5, well included and on the inner side of the tube, sessile, oblong, laterally dehiscent, broad at the base, pointed toward the apex; pistil very small.

Type specimen number 12835, collected by *A. D. E. Elmer* in stony ground of wooded river banks at 1000 feet altitude, — Brooks Point, Palawan, March 1911. Named after our son, *Anton D. Elmer, M. D.*

The leaves of *Aglaia antonii Elm.* bear two more pairs of jugate leaflets which are thicker in texture, have twice as long petiolules and have a much finer system of lateral nerves than *Aglaia palawanensis Merr.* The indumentum on our inflorescence is much darker and denser than on *Merrill's* type specimen from Palawan, which again seems to indicate a close affinity with *Aglaia micrantha Merr.* The calyx teeth in our specimens are conspicuous, not at all cup shaped as in *Aglaia curranii Merr.* and with an altogether different indumentum.

Aglaia apoana Merr.

The following specimen was collected in the type locality and distributed under the above specific name.

Field-note for 11643 from Todaya, Mindanao, July 1909:—Small tree in dense forests of moist fertile humus covered soil at 4000 feet; stem 20 feet high, 7 inches thick, branched from the middle; branches spreading and laxly rebranched, the twigs half drooping; bark smooth, brown; wood hard, only the thin sapwood whitish, otherwise red: twigs or leafy portion ascending, dark brown scurfy as is also the ascending or horizontal leaf stalks; leaflets horizontal, flat, deep green above, much lighter beneath, coriaceous; inflorescence pendulous, 1 to 2 feet long and branched, slightly fragrant, the yellowish stalks covered with brown hairs or scales, the flowers creamy yellow, the whole inflorescence as well as the leaves quite soft and flexible, the twigs very tough. "Doco-doco" in Bagobo.

Aglaia banahaensis Elm. n. sp.

A small tree, about 5 m high, in woodlands; branches forming a round spreading crown, coarse, tough; twigs glabrate when old, brownish, the younger portion covered with minute bran like deciduous scales; leaves alternate, 2 to 3 dm long, ascending, rigid, curing leather brown; petiole varying from 3 to 5 or even 8 cm in length, stout, subterete, much thickened at the base, slightly caniculate along the upper side, with a deciduous brown indumentum; rachis similar in color and vestiture, caniculate above, otherwise terete, thinner than the petiole; leaflets 3-jugate, leaving large scars after falling, bi or trifoliate at the upper end, subelliptic for the basal ones, oblong for the lateral blades, the terminal ones obovately oblong, entire, apex rounded to short acute, base obtuse to subattenuate, the base of the uppermost leaflets usually a trifle inequilateral, glabrous, rigidly coriaceous, leather brown when dry on both sides, 9 to 15 cm long with the petiolule, 4 to 6 cm wide across the middle for the lower ones and above the middle for the upper ones; petiolules very stout and deeply grooved along the upper side, the lower ones 5 to 8 mm long, the terminal ones slenderer and 1 cm in length; midrib stout, ridged, straight, shallowly grooved along the upper glabrous surface, sprinkled with scales along the lower surface; nerves 8 to 10 on each side of the midrib, ascending, quite evident beneath, obscure above, glabrate on both surfaces; reticulations none or obsolete; fruiting panicle 15 cm long more or less, axillary, erect or ascending, also rigid, branched from near the base, the branchlets divaricate and few rebranched, tawny when dry, apparently densely lepidote; pedicels of the immature fruit thick, 3 to 5 mm long, minutely wrinkled and scale covered; fruits up to 2 cm long, subglobose to obovoidly so, becoming rugose while drying, also covered with brown minute scales which ultimately wear off.

Type specimen number 7522, collected by *A. D. E. Elmer* in woods at 750 feet altitude,—Lucban, Tayabas province, Luzon, May 1906.

The arrangement, shape, color, texture and glabrous venation of our specimen seem to differ from 772 *Cuming* or *Aglaia turczaninowii C.DC.* which is now considered identical with *Aglaia llanosiana* of the same author. It does not match a co-type specimen of *Aglaia aherniana Perk.* Nor is it the same as a specimen cited in the original description of *Aglaia harmsiana Perk.* which indicates a relationship to *Aglaia pauciflora Merr.*

Aglaia brachybotrys Merr.

Numbers 11207 and 13626a were both distributed under the above specific name.

Field-note for 11207 from Todaya, Mindanao, July 1909: ——Small tree, 30 feet high or less, with a 10 inch thick stem, in black soil strewn with rocks in woods of a ravine near the Sibulan river at 1500 feet; stem crooked but subterete, branched above the middle; bark smooth, bleeding with latex, mottled with yellowish and gray blotches; wood moderately hard, reddish brown toward the center, odorless and tasteless; branches horizontally spreading, the yellowish brown twigs suberect; petioles greenish, swollen at the base; leaflets submembranous, usually ascending, conduplicate on the upper shining green surface, paler and duller beneath, only slightly recurved except toward the apex, margins more or less wavy; infructescence ascending from the leaf axils, 1 to 6 inches long, divarirately branched, all the stalks greenish; fruit obovoid, one half inch thick, 2 to 3-seeded, turning red at the sunken apex. "Togoat-cobing" in Bagobo.

Aglaia calelanensis Elm. n. sp.

A small erect tree; stem 7 m high, 10 to 15 cm thick, chiefly branched toward the top; wood moderately hard, odorless and tasteless, the thin sapwood white, otherwise reddish; bark smoothish, mottled; twigs not numerous, spreading, rather coarse or stout, longitudinally wrinkled in the dry state, fuligineus indumentum, 1.5 cm thick even in the dry condition; leaves heavy, horizontally spreading, 6 dm long; petiole 15 or 20 cm long on our specimen, very strong, 5 mm thick on the dry specimen, gradually thickened toward the swollen base, terete, longitudinally wrinkled throughout, covered with a dense fuligineus indumentum, somewhat flattened and depressed on the upper side toward the base, straight; rachis strict, also stout, similarly wrinkled and covered with the same kind of an indumentum; petiolules 1.5 cm long, the terminal one 1 cm longer, striately wrinkled lengthwise, rugulose on the lower side toward the thickened base, narrowly grooved along the upper side; our specimen 4-jugate, trifoliate at the distal end, the other leaflets well scattered and opposite, flat or only the sharply acuminate to setaceously pointed tips recurved, when fresh very deep green and glabrous on their upper surfaces, when dry of a dark leather brown above, the fuligineus lower surface quite evenly scattered with small, umbrinus colored and stellate scales, yellowish green beneath when compared with the upper surface in the fresh state, entire but margins obscurely involute at least in the dry specimens, the blades

15 to 25 dm long by 7 to 10 cm wide across the middle, oblong in shape, the lower ones usually somewhat smaller and broadly ovately oblong, base of the upper leaflets acute to subcuneate and equilateral, the lower ones obtuse to obtusely rounded, a trifle inequilateral; midrib ridged and densely covered with a fuligineus indumentum beneath, straight, striate, sunken along the upper surface and in the early stage scale covered; nerves 12 to 18, evident and glabrate above, occasional secondary nerves are between the larger ones, ascending and subparallel, lepidote and comparatively conspicuous on the nether side, tips ascendingly curved and becoming obsolete; reticulations obscure; infructescence 10 to 20 cm long or longer, axillary, with a rusty brown indumentum, very short branched, the longer branches arising from near the base and very sparingly rebranched, in the dry state longitudinally warped or wrinkled; fruiting pedicels short and thick, wrinkled and scaly, with a ring like constriction where the fruits usually become separated, leaving circular scars; fruits upon a short and thick stipe which usually bears the calyx remnants from the upper end, also rusty brown or fuligineus, subglobose or compressed globose, 1.5 to 2 cm in diameter, the thin rind easily breaking when dry, normally 2-seeded, by abortion only 1-seeded; calyx 2.5 mm long, the basal one third much constricted, densely covered with tawny more or less ciliate scales, the upper portion short ellipsoid or obscurely obovoid, the rounded teeth strongly enclosing the inner organs; petals 5, united at the base, very rigid, strongly concavo-convex and imbricated, scarcely more than 1 mm long, broadly elliptic or orbicular, the inner ones smaller; stamineal tube young, rather short, also glabrous, subentire at the orifice; anthers 5 or more, short, somewhat pointed toward the apex; pistil immature, small, apparently glabrous. "Lacocan" in Bagobo.

Type specimen number 11804, collected by *A. D. E. Elmer* upon a forested ridge at 6000 feet altitude of mount Calelan,— Todaya, Davao district, Mindanao, July 1909.

Our specimen with *Aglaia cauliflora Koodr.* from the Celebes, *Aglaia trunciflora Merr.* from Leyte and *Aglaia caulobotrys Quis.* and *Merr.* collected in the Davao district of Mindanao form a nice little group of large leafed species of *Aglaia.* The axillary inflorescence of our species, the different fruits and the minute scale covered lower surface of our leaflets are the main points of distinction.

Aglaia clarkii Merr.

This specimen was collected and distributed under the above specific name.

Field-note for 12457 from Magallanes, Sibuyan island. April 1910:—Burly trees on a steep wooded north hillside next to the sea and in stony soil; stem 1 to 2 feet thick, 30 to 40 feet high, its main branches arising from about the middle; wood quite hard, heavy, burly, white on the outside, otherwise reddish, tasteless, with a distinct pleasant woody odor; bark grayish white, shallowly checked, quite thick, yellowish beneath the epidermis; branches rather slender, not numerous, curved and suberect, the twigs 1 inch thick; leaves horizontally spreading, margins curved upon the lower side and rugose, triangularly thickened at the base, the rachis also rufus; leaflets rigidly coriaceous, horizontal or descending when old, shining deep green above except the lighter green vein marks, beneath rufescent; infructescence from the uppermost leaf axils, upon stout subpendulous 6 inches long stalks; fruits obovoidly ellipsoid, yellowish brown, 3 to 4 inches long, 2-celled, 4-seeded. "Bayod" in Visayan.

Aglaia copelandii Elm. n. sp.

A small and erect tree; stem 3 dm thick, subterete, crooked, 10 m high or higher, branched toward the top; wood rather hard and tough, odorless and tasteless, the white sapwood gradually changing to the testaceus center: bark thick, isabellinus, roughened with blunt excrescences, nearly fulvus otherwise, the inner side with milky juice; branches spreading, rather numerously rebranched; the twigs ascending, their young portion castaneus in color when dry; leaves up to 2 dm long, horizontally spreading, dark green above and paler beneath when fresh, coriaceous, the entire margins wavy and tips twistingly recurved, alternately crowded toward the ends of the branchlets; petiole ascending, persistent, 5 cm long more or less, seemingly glabrous but densely covered with minute castaneus colored scales, plane along the upper side, slender, more or less thickened at the base and leaving large scars upon falling, obscurely angular, more angular toward the triangular rachis which is quite slender and similarly lepidote; leaflets 5 to 7 pairs, usually opposite but sometimes becoming scattered toward the distal end, with 3 blades at the end, curing unequally, black and glabrous above, brown and seemingly glabrous beneath, deciduous, mainly lance shaped, often subfalcate, the longer ones 10 cm including the petiolule by 2.5 cm wide, frequently smaller, gradually tapering to the acuminate apex, base acute to obtuse, the margins entire, the lower half usually a trifle inequilateral; the true petiolules 5 mm long, flat and shallowly grooved above, base not enlarged, in the early state covered with a castaneus lepidote indumentum; midrib prominent on both sides, nearly smooth on the upper surface, the lower side more or less covered with brown fugacious the foliage or 1 to 2 dm in length, branched from below scales, nearly black on the lower brown leaflet surface; nerves quite evident below only, parallel and ascending, of the same color as the midrib, 10 to 15 on a side, glabrate; infructescence axillary, ascendingly spreading, shorter than the middle or from near the base; the branchlets flexible when fresh, quite rigid, compressed and striate when dry, all with the similarly colored lepidote indumentum either in the fresh or dry condition; fruits upon short thick pedicels, densely covered with dark bran like small scales, globose or nearly globose, sometimes distinctly obovoid, up to 1.5 cm across, when fresh latericius, when dry wrinkled and dark cupreus in color, densely plastered over with very small latericius colored scales; the calyx with the 5 obtusely rounded segments persistent and minutely lepidote on the exterior. "Marinahay" in Manobo.

Type specimen number 14070, collected by *A. D. E. Elmer* in stony soil of humid forested slopes above the lagoon basin or at 4750 feet altitude,—Cabadbaran, Agusan province, Mindanao, October 1912. Named after *Dr. E. B. Copeland.*

This number seems to belong in the group with *Aglaia acuminata Merr.* and *Aglaia laevigata Merr.* From the latter it is known by its narrower more pointed leaves, especially at the basal end. The deep or dull copper brown color of our infructescence is not evident on *Merrill's* species.

Aglaia cuprea Elm. n. sp.

Comparatively a small tree; stem 25 cm thick, wadded toward the base, subterete above, crooked, 8 m high or higher, chiefly branched at or near the top; wood hard, the thin sapwood portion white, gradually turning red toward the center; bark brown or yellowish so, latericius otherwise, excrescent, the inner side with milky sap; branches spreading, also crooked, ascending, not numerously rebranched; twigs long, 2.5 cm thick at least, when dry conspicuously fluted longitudinally, covered with bran like and fuligineusly colored scales; leaves alternatingly scattered toward the ends of the ultimate branches, a meter or more in length, much smaller on our specimen, ascending or horizontal, coriaceous or subcoriaceous; petiole 10 to 20 cm lòng but no doubt longer in the larger leaves, very stout and much thickened at the prominently fluted base, deeply grooved along the upper side, the upper basal portion broadly excavated, the dense scales fuligineus in color, the lower basal portion often provided with lenticels or excrescences; rachis also grooved along the upper side, otherwise subterete and longitudinally striate, similar in color and vestiture, comparatively stout; petiolules also stout, slightly thickened at the base, caniculate along the upper side, 1 cm long, the lower side usually roughened; leaflets glabrous and leather brown on the upper side when dry, beneath evenly sprinkled with circular scales whose center is darker brown, 10 by 24 cm but most on my specimen are smaller especially the basal ones, trifoliate at the distal end, the others subopposite, 3 to 4-jugate or even 5-jugate on the larger leaves, the smallest blade on my specimen measures 4.5 by 10 cm, apex short acute to obtuse, base broadly obtuse to rounded in general outline, the upper half of the blade terminating at the base 1 cm above the lower half of the blade; midrib pronounced beneath, sunken above, copper brown lepidote on both sides of the laminae; nerves 7 to 15 according to the size of the blade, deep brown as is the midrib, glabrous and evident above, beneath scaly, strictly ascending and parallel, conspicuous beneath except the obscure tips; reticulations obscure or none; infructescence ascending from the leaf axils, 15 to 25 cm long, coarsely paniculate, few branched; the main stalks stout and woody, the main branches arising from below the middle and divaricately spreading, the ultimate branchlets very short, all densely coated with a copper brown matrix of appressed scales; pedicels short and thick, with a ring like constriction; the very short fruiting stipe usually with a persistent calyx remnant subtending the fruits proper; fruits obovoid, very hard, 2 cm long, 1.5 cm across above the middle, often somewhat compressed, obscurely 10 or more ridged from base to apex, these ridges are shallowly and transversely constricted giving a rugulose or pustulate appearance, totally covered with a rich copper brown indumentum.

Type specimen number 16058, collected by *A. D. E. Elmer* in wet more or less stony ground of a very humid wooded depression at 2000 feet altitude,—Irosin, Sorsogon province, Luzon, May 1916.

Our specimen is only in ripe fruit and *Aglaia multifoliola Merr.* is in the bud state. However, our leaflets seem to indicate a different species. This same difference holds true when comparing our leaves with *Aglaia ramosii Quis.* The unique fruits of our species do not seem to be duplicated in the entire *Aglaia* collection of the Bureau of Science.

Aglaia davaoensis Elm. n. sp.

A shrub or shrub like tree, 5 m high, its branches lax and drooping; wood moderately hard and heavy, odorless and tasteless, the sapwood whitish, the much larger central portion red; bark brown, reddish beneath the epidermis, smooth; twigs thin, crooked, very lax, 3 to 5 mm thick, the tawny colored indumentum on the young parts becoming deciduous when older; leaves chartaceous or submembranous, flat, horizontally spreading or descending, 15 to 25 cm in length, 2-jugate, 3-foliate at the distal end, curing nearly equally brown on both of the glabrous sides; the petiole slightly thickened at the base, slender, subterete, obscurely channelled along the upper side, the tawny brown puberulence or tomentum wearing off, 3 to 5 cm long on my specimen; rachis as long, subfiliform, minutely caniculate, otherwise very similar to the petiole; petiolules 5 to 10 mm long, thin or slender, reddish brown tomentose, minutely caniculate along the upper side; all of our leaflets with petiolules measure 3 to 4 cm in length only; the blades oblanceolate in general outline or oblongish for the upper ones, the basal pair of leaflets considerably smaller and more or less oblong in shape, 2-jugate, the basal pair on our specimen always opposite and broadly obtuse at the base, the 3 terminal ones subcuneate at the base, apex sharply recurved on all, abruptly acute to sharply acuminate, curing darker brown or murinus on the upper surface, in the fresh state lighter or yellowish green beneath, the lower leaflets 3.5 cm wide across the middle and 8 cm long, the upper or larger ones 5 cm wide above the middle and 16 cm long; midrib raised beneath and narrowly grooved above, below tawny brown tomentose, stout and straight; nerves flecked with bran like fugacious scales, ascending and subparallel, the ascendingly curved tips interarching, ultimately glabrate, 7 to 10 on each side according to the size of the laminae, quite conspicuous below, evident above; reticulations obscure; inflorescence also very lax, 10 to 18 cm long, paniculate, its main branches from near the base and divaricately rebranched, all the main stalks rufus brown covered with minute scales, the secondary branches well spreading and filiform. all similarly covered with stellate or ciliate scales, ebracteolate even the slender 3 to 5 mm long pedicels; flowers well scattered, small, fragrant and light yellow when in full anthesis; calyx 1.5 mm high, as thick across the top, constricted toward the base into a pedicel like stalk, 1 mm in length, covered with latericius short stellate pubescence; segments 5, erect, triangularly oblong, acute toward the apex, quite rigid; petals erect, slightly curved, united only at the base, 1.75 mm long, nearly 1 mm wide, oblong.

truncate at the base, obtuse at the apex, imbricate in the subglobose bud state, glabrous on both sides; stamineal tube coriaceous, very short and relatively broad, less than 0.5 mm high, subentire across the truncate apex, likewise glabrous on the inner and outer sides; anthers 5, upon the rim or a trifle below it, broadly ovate, sessile, 0.33 to 0.5 mm long, fully as wide across the base, more or less pointed toward the apex, the greater portion exerted and extending toward the center, dehiscing along the lateral edges; ovary minute, apparently puberulent, terminated by an apiculate glabrous stigma. "Mata-mata" in Bagobo.

Type specimen number 10925, collected by *A. D. E. Elmer* in dense forests of rich moist soil at 3750 feet altitude north of the Baruring river,— Todaya, Davao district, Mindanao, June 1909.

This specimen was collected in the same regional forests of mount Apo and is very similar in many respects *to Aglaia longipetiolata Elm.* Its much shorter petiolules and the difference in shape of the terminal leaflets at once mark them as distinct. From *Aglaia affinis Merr.* and *Aglaia diffusa Merr.* our species differs in its thinner leaflets which are more or less pubescent beneath along the midrib and by the pronounced calyx segments. The larger differently colored dry leaves, the longer terminal leaflets, the acute calyx segments covered with a different tomentum characterize it from *Aglaia palawanensis Merr.*

Aglaia denticulata Turcz.

Numbers 6729, 7890, 8378, 9306, 10704, 11616, 11784 and 18224 were all distributed under the above specific name.

Field-note for 11784 from Todaya, Mindanao, July 1909:—Tree, 30 feet high, with a 1.5 foot thick stem, in a humid wooded gulch at 2750 feet between the junction of the Perak creek and Sibulan river; bark mottled, smoothish, reddish brown beneath the epidermis; wood odorless and tasteless, white or pinkish red toward the center; leaves coriaceous, horizontal or descending, conduplicate on the upper dull green surface, paler beneath or even yellowish green; inflorescence ascending, axillary, 1 to 2 feet long, the stalks and calyx densely covered with brown lepidote scales; corolla light yellow. "Duco-duco" in Bagobo.

Aglaia diffusa Merr.

This specimen number 18065 was collected at Los Baños, Luzon, July 1917, and was distributed under the above specific name.

Here is a small but very critical group, primarily comprising *Aglaia affinis Merr.* and *Aglaia diffusa Merr.*, and their diversion into a number of other quite distinct species. These closely allied plants form an ever complexing problem for the taxonomist. The type of the former came from Balabac of southern Palawan, and up to date typical specimens have come in from Zamboanga, which is what one would expect from the standpoint of a geographical distribution. But up here, throughout middle and northern Luzon, is the latter species, so close and yet apparently distinct if one compares the two type specimens by holding them side by side. It is difficult to compare closely allied species with either of them (see my notes under *Aglaia banahaensis Elm.* and *Aglaia urdanetensis Elm.*), and it is almost impossible to classify them by description alone. Botanists are not wholly responsible for these troublesome nicks in our system of classification, for these plants do exist in their native state in which they have acquired their differential characters.

So, in dealing with *Aglaias* one must recognize small characters, especially when it comes to the study of scales and flowers. There seems to be good different characters in the mature fruits which collectors cannot or do not always obtain. The foliage provides ample differences in size, shape and character of its indumentum,— the latter greatly varying from a glabrous condition as in *Aglaia cumingiana Turcz.* and *Aglaia laevigata Merr.*, to *Aglaia bicolor Merr.*, *Aglaia ramosii Quis.* and *Aglaia multifoliola Merr.*, all of which leaves are densely covered with copper brown scales beneath.

Field-note not given.

Aglaia diffusiflora Merr.

Numbers 14934 and 16596 were distributed as *Aglaia bulusanensis Elm.*, but upon a closer comparison they seem to belong to the above species.

Besides the type specimen from Panay our contributions are the only ones in extant and are not at all typical. especially number 14934 which has a distinctive leaf cut. It is more distantly related to *Aglaia bicolor* of the same author.

Field-note for 16596 from Irosin, Luzon, July 1916:— Small erect tree in stony ground of a steep ravine covered with woods at 1000 feet; stem 3 inches thick, terete, nearly straight, 15 feet high, branches from the middle or above it; wood white or with a reddish tinge toward the center, soft or moderately so; bark smooth, grayish white mottled, sappy white otherwise; branches ascending, not numerously rebranched, the rigid twigs also ascending; leaves alternately scattered toward their ends; the leaflets rigidly coriaceous, much lighter or yellowish green beneath, shallowly folded; panicle axillary, all the stalks greenish; the knob like slightly odorous flowers pale yellow.

Aglaia harmsiana Perk.

Both numbers 6452 and 7137 were distributed under the above specific name.

Field-note for 7137 from Palo, Leyte, January 1906:—A moderately hardwood tree, 25 feet high, with smooth gray bark; panicle yellowish, drooping from the leaf axils, 1 to 2 feet long.

Aglaia ilcilo (Blco.) Merr.

Number 17169 was distributed as *Aglaia nivea Elm.*, and numbers 8755 and 18293 under the above specific name.

Blanco's species is frequently met throughout the Philippines in the hill country, but its variety with large leaves is only sparingly collected in the Visayan region.

Field-note for 8755 from Baguio, Luzon, March 1907:—Tall trees, with a spreading round top, in canyons below Autop; thick bark shallowly checked on the stem; bark of the thick branches yellowish with brown lenticels; leaves coriaceous, descending, shining green above, rusty yellow beneath, deciduous, leaving large broadly elliptic scars; infructescence subpendulous, axillary, one and one half feet long; the obovoid fruits are sessile.

Aglaia langlassei C.DC.

Number 17957 was distributed under *Aglaia lagunensis Merr.*, and number 17659 under *Aglaia harmsiana Perk.*

Field-note for 17659 from Los Baños, Luzon, June 1917:—Small tree in very humid forests; stems 8 inches thick, much branched toward the top; wood hard, reddish brown except the thin sapwood; infructescence lateral or axillary, 6 inches long, the nuts pale green.

Aglaia llanosiana C.DC.

Numbers 16549, 16859 and 18319 were distributed under the above specific name. Numbers 6325, 7538, 7914 and 8776 were distributed under *Aglaia turczaninowii C.DC.* which is now considered identical. *Amoora lepidota Merr.* is also a synonym.

Field-note for 16549 from Irosin, Luzon, July 1916:—Small tree in woodlands along a stream at 750 feet; stem 6 inches thick, 20 feet high, terete, branched above the middle; wood whitish especially the outside, moderately hard, covered with smooth brown bark; the main ascending branches laxly rebranched; leaflets thinly chartaceous, horizontal, nearly flat except the recurved tips, lucid above, much lighter green beneath; infructescence suberect, 6 inches long, with few short branches above the middle, all the stalks dull green; the globose one half inch thick fruits yellowish white but reddish tinged when mature.

Aglaia longipetiolata Elm. n. sp.

A large or medium sized tree; trunk 6 dm across, 15 m high; wood moderately hard, white on the outside, the central portion pale red, odorless and tasteless; bark fairly smooth, mottled, the epidermis falling in irregular plates, leaving the cinnamon brown under surface exposed; main branches ascending, arising from the middle, the ultimate ones numerous and forming a dense crown; twigs slender, lax, 5 mm thick, the young green tip covered with an umbrinus colored lepidote matrix; leaves spreading horizontally, alternate from the ends of the ultimate branchlets, 2 to 3 dm in length, numerous, subcoriaceous; petiole 5 to 8 cm long, covered with fine umber colored indumentum, very slender, remarkably thickened at the base, caniculate along the upper side, strict, subterete, longitudinally striate, scales minute and appressed; rachis obscurely striate or only minutely caniculate along the upper side, even more slender, the scaly surface dark umber in color; petiolules subfiliform, mostly 1.5 to 2 cm long, the terminal ones often 3 cm in length, the lateral ones sometimes only 1 cm long, the basal one half only slightly thickened, similar in vestiture but the scales usually wearing off along the upper narrowly caniculate surface; leaflets chiefly 3-jugate yet can have one pair more or less, descending, nearly flat or shallowly conduplicate on the upper glabrous and very dark green surface, comparatively yellowish green on the subglabrous nether or lower surface, subcoriaceous, entire, curing tan brown on both sides, slightly inequilateral at the acute to obtuse base, the smaller laminae broadly lanceolate or narrowly oblong to ovately oblong, gradually tapering to the acute to subacuminate apex, varying from 2 by 6 to 4 by 12 cm in size without the petiolules, 3-foliate at the distal end, rarely 2-foliate, the lower blades subopposite or alternate, the lateral laminae sometimes opposite; midrib minutely caniculate and subglabrous on the upper side, beneath rather prominent and sprinkled with smaller reddish brown scales; nerves 7 to 10 on each side of the midrib, glabrous on both sides, obscure above, beneath quite visible and much lighter colored than the midrib, much ascending; reticulations similar in color and rather evident on the nether side only, tips anastamosing; inflorescence ascending from the leaf axils, 1 to 3 dm long or sometimes longer, lax, entirely covered with a deep umber brown tomentum or indumentum; the lower or longest branches from near the base, slender, divaricately spreading, all branches alternate, ebracteolate even the short secondary ones, all the stalks more or less compressed and striately wrinkled in the dry state, the ultimate branchlets rather evenly short rebranched; flowers odorous and light yellow when fresh, not crowded but well scattered upon divaricate 2 to 3 mm long pedicels which are sometimes provided with subtending bract vestiges; calyx 1.5 mm high, rather rigid, turbinate, on the exterior entirely covered with minute tawny scales; segments 5, erect, ovate to subelliptic, somewhat unequal in size, obtuse at the apex; petals slightly united at the base and to the basal portion of the anther tube, 1.75 mm long, 1 mm wide, truncately oblong or subelliptic, glabrous, coriaceous, convex on the ventral side especially toward the top, in the early state imbricate; stamineal tube 1 mm either dimension, narrowed toward the base, the apical rim obscurely 5-rugose, also glabrous on both sides and coriaceous; anthers 5, sessilely inserted upon the inner side of the apical tube portion and partially extending over the orifice, 0.25 mm long, about as wide across the basal portion, obscurely triangular and pointed or submucronate at the apex, laterally dehiscent; ovary globose, short but densely hairy, terminated by a sessile, glabrous and flattened stigma. "Duco-duco" in Manobo.

Type specimen number 11829, collected by *A. D. E. Elmer* on the very steep wooded slopes of the Baruring canyon at 3000 feet altitude,—Todaya, Davao district, Mindanao, July 1909.

The size, shape, venation and texture of the leaves are quite similar to those of *Aglaia curranii Merr.* of mount Mariveles. Yet our new species here described has unusually slender petiolules for the fewer leaflets, and distinctly pedicelled flowers whose calyces are prominently toothed. The general characters of our specimen also serve to keep it separate from *Aglaia langlassei C.DC.* The shape of our leaf blades also remind one of *Aglaia rizalensis Merr.*

Aglaia luzoniensis (Vid.) Merr. and Rlf.

Numbers 13075, 15388, 16372, 17193 and 17283 were distributed under the above specific name. Numbers 16943 and 12222 were distributed under new varietal names. Upon further comparing the latter two numbers with the great mass in the general herbarium, there appears to be a wide variation in the above named species. This material is usually marked as *Aglaia luzoniensis trifoliata Merr.* and *Rlf.*, *Aglaia unifoliata Koodr.* and *Aglaia monophylla Perk.* The variety with three leaflets seem to assume a relationship with similar 5-foliate species. And among the single leafed specimens, notice the difference in size and shape of the foliage on *Aglaia brevipetiolata Merr.* and that on my number 12222. Here also compare *Aglaia rizalensis Merr.* with alternate simple leaves.

Field-note for 13075 from Brooks Point, Palawan, March 1911:—Suberect shrub, in black or adobe soil of a low densely wooded flat at 50 feet; stem terete, nearly 2 inches thick, 10 to 15 feet high, branched from the middle; wood quite hard, the outer half white, the central mass nearly badius brown, without odor or taste; bark very smooth, latericius except the epidermis, the inner whitish surface with milky sap; main branches ascending, ultimately widely rebranched, the slender and lax branchlets horizontally spreading or even drooping; leaves similarly spreading, coriaceous, nearly flat or folded upon the upper darker green surface and recurved toward their apices, much paler or yellowish green beneath; inflorescent stalks fulvus, the small flowers flavus; fruits dull flavus but when fully ripe dull ruber red, ellipsoid, always less than one half inch long, the solitary seeds surrounded by a dull yellowish membrane.

Aglaia merrillii Elm. n. sp.

A small tree; stem 2 dm thick, 8 m high, branched from or toward the top, crooked and gnarly, not smooth nor terete; bark yellowish gray, relatively thin, green beneath the epidermis, otherwise whitish, very excrescent;

wood moderately hard, closely grained, dingy to yellowish except the light castaneus central portion, tasteless, nearly odorless; branches freely rebranched, the lax twigs ascendingly curved; leaves horizontal or drooping, subcoriaceous or subchartaceous when dry, nearly flat, much paler green beneath and lighter brown when cured, glabrous, alternating, terminating the short glabrous twigs, 2 to 3 dm long; petiole 4 to 7 cm long, flattened along the upper side, grooved toward the thickened base, when young covered with a fine yellowish brown adpressed ciliate pubescence, ultimately glabrate; rachis slender and very similar; petiolules 5 to 8 mm long, much thickened except at the blade attachment, transversely rugose especially the lower portion, leaving large scars upon falling; leaflets 5 to 7, alternate, entire, the basal ones usually smaller, more crowded toward the distal end, oblong, occasionally the smaller ones ovately so, 7 to 17 cm long by 3 to 7 cm wide across the middle, obtuse and slightly inequilateral at the base, short or bluntly obtuse at the apex; midrib prominent beneath; the reticulations most evident on the lower side; inflorescence in small pendant clusters, along the stem mainly, arising from coarse woody excrescences, glabrous or subglabrous; spikes dark green, drying dull yellowish brown, 5 to 20 cm in length, flexible; flowers regularly and alternately scattered along the entire length of the spikes, leaving raised scars upon falling, cremeus, caducous, button shaped; buds green; calyx upon a stout 2 mm long pseudostalk, the expanded 5-lobed apical portion 4 mm across, puberulent on the exterior of the lobed portion, the constricted portion nearly glabrous; the segments imbricate in the bud state, in anthesis widely spreading, rigidly coriaceous, rotund or ovately rounded, 1.25 mm across, edges minutely fringed with ciliate hairs; corolla bud globose, nearly 5 mm in diameter; petals 5 mm long, coriaceous, glabrous, strongly imbricate, very thick toward the base and united, margins thinner in texture, obscurely punctate spotted below the margins, the outer ones broadly orbicular, the inner ones subcuneate, deeply concave on the ventral surface; stamineal tube fully 3 mm long, united toward the base with the basal portion of the petals; the free tube 3.5 mm across and 1.25 mm deep, very thick, glabrous, subentire across the truncate apex; anthers 9, erect, the upper one third exerted, sessilely inserted on the inner side of the tube, attached dorsally toward the base, oblong, 1.25 mm long, blunt at both ends, laterally dehiscent; ovary brown, cylindric, 3 mm long, 1.25 mm thick, puberulent, ridged toward the flat glabrous stigma whose basal portion is deeply excavated by the brown anthers in the earlier state. "Buka" in Manobo.

Type specimen number 13285, collected by *A. D. E. Elmer* in a deep ravine near a forested ridge at 1250 feet altitude,—Cabadbaran, Agusan province, Mindanao, August 1912. Named after *Dr. E. D. Merrill.*

This species also has a strong reticulation in its foliage, but it cannot be refered to *Aglaia reticulata Elm.* nor to *Aglaia everettii Merr.* Is it a species of *Aglaia* or does it belong to the monotypic genus *Reinwardtiodendron?*

Aglaia odorata Lour.

This specimen number 16910 was collected in Manila, August 1916 and was distributed under the above specific name. It is an introduced shrub and cultivated in many towns for its fragrance.

Field-note not given.

Aglaia oligantha C.DC.

Number 14116 was distributed as *Aglaia anonoides Elm.,* numbers 15273, 16285, 16518, 16923 and 17177 were distributed under *Aglaia bordenii Merr.*

Our numbers are not typical of 1278 *Cuming's* collection from Cagayan, and *Aglaia bordenii Merr.* may yet prove to be sufficiently distinct.

Field-note for 14116 from Cabadbaran, Mindanao, October 1912:—Small erect tree in heavy forests of a steep incline at 4000 feet on Cawilanan peak, in compact reddish soil; stem 6 inches thick, terete, straight, up to 25 feet high, branched from the middle; wood moderately soft, odorless and quite tasteless, whitish, reddish tinged in the center; bark smooth and yellowish gray, the hypodermis green, otherwise sappy white; main branches divaricate, freely rebranched; leaves horizontal, recurved, subcoriaceous, a trifle paler green beneath; fruits upon one half inch long rather thick and greenish suberect stalks from the leaf axils, obovoidly globose, usually in small clusters, three fourths of an inch long, pale yellowish green. "Pamoteon" in Manobo.

Aglaia pauciflora Merr.

Numbers 9307, 10687 and 13986 were distributed under the above specific name.

Field-note for 13986 from Cabadbaran, Mindanao, October 1912:—Medium sized tree in loose well drained soil of very steep and densely forested slopes of a ravine at 1250 feet; trunk crooked, wadded especially toward the base, 1.5 foot thick, 30 feet high, branched from the middle; wood rather hard, the thin sappy portion white, the greater central mass atropurpureus, the intervening portion incarnatus, odorless and without taste; bark thin, smoothish and brownish, the inner surface whitish, the middle portion nearly roseus; main branches ascending, crookedly rebranched and spreading, ultimately the one half inch thick twigs fuligineus; leaves horizontal or ascending; leaflets similarly spreading, very deep green above, yellowish green beneath, nearly flat; inflorescence ascending, lax, fuligineus, the bud like flowers caducous and aurantiaceus; paniculate fruit cluster pendant from the branchlets, 10 inches long, the subglobose nuts 1 inch across and also fuligineus. "Bayaan" in Manobo.

Aglaia perfulva Elm. n. sp.

A very slender tree; stem 6 cm thick, terete, more or less crooked, 8 m high, unbranched or only few branched at the very top; wood moderately hard, odorless and tasteless, sappy white or more reddish brown in the center, covered with nearly smooth grayish brown bark, the younger portion of which beset with conspicuous lighter brown lenticels; the branchlets erect, 2 cm thick; leaves crowded toward the ends, alternate, heavy and horizontally spreading, leaving scars after falling, 4 to 7 dm long on my specimens; petiole from 1 to 3 dm long, the young ones densely yellowish brown pubescent, stout and subligneous when old, gradually thickened and rugose toward the base, flattened along the upper side, scurfy; rachis subterete, longitudinally rugose or wrinkled in the dry condition, densely covered with small stellate scales fulvus in color; petiolules 3 to 5 mm in length, the terminal petiolule on one of my smaller leaves only twice as long and 4 cm long on my larger leaf, much thickened and longitudinally wrinkled upon the lower portion, similarly covered with a dense stellately fulvus pubescence; leaflets 5 to 8 pairs, strictly opposite or nearly so, the terminal blades 3-foliate, rather evenl scattered, the basal ones usually somewhat smaller, the longer leaflets 2 dm long or longer, 5 cm wide across the middle, the basal or smaller ones 3 by 8 cm, thickly coriaceous, shining deep green on the upper convex glabrous surface, leather brown when dry, densely fulvus or yellowish brown beneath with stellular scales, margins entire but strongly revolute, linearly oblong, gradually tapering to the acuminate apex, base obtuse to obtusely rounded and where it often is minutely auriculate, the base of the apical leaflets is more tapering; midrib stout and ridged beneath, similarly covered with a fulvus indumentum, grooved on the upper side of the blade and filled with fine gray hairs which soon disappear; nerves 20 to 30 on each side of the midrib according to size of the blades, barely visible from either side, strict and parallel, only their tips ascendingly curved, similar in vestiture as its strong midrib; infructescence from the lower leaf axils, upon 4 to 6 cm long and thick half woody stalks which bear 2 or 3 clusters of fruits; the fruits are large, subglobose, irregularly compressed or constricted toward the base, upon short and stout pedicels, covered with the same but more dense indumentum, 4 to 7 cm in diameter, dehiscing from the apex into 3 thick carpels; seeds few in each third, packed between white fleshy meat, 1.5 cm by 2.5 cm on my dry specimens, murinus colored, attached longitudinally along the ventral side, laterally compressed, back concave.

Type specimen number 13121, collected by *A. D. E. Elmer* in red soil mixed with gravel on wooded flats near the river at 250 feet altitude,—Brooks Point, Palawan, March 1911.

Allied to *Aglaia bernardoi Merr.*, from which our specimen is readily differentiated by the densely fulvus lower leaf surface; its smooth and shining upper leaf surface and by the evident lack of cross bar reticulations. Furthermore, it is also allied to *Aglaia clarkii Merr.*, the shape of the leaflets and fruits primarily separate them. Notice the difference in the size of our species here described and my specimen number 12457 distributed under the latter name.

Aglaia querciflorescens Elm. n. sp.

A small tree; stem round, 2.5 dm thick, 12 m high, crooked, mainly branched toward the top; wood odorless and tasteless, the outer portion whitish, rather abruptly changing to the latericius central mass, moderately hard; bark yellowish gray mottled, smoothish, also reddish brown beneath the epidermis; main branches repeatedly rebranched; the younger portion of the twigs tawny or yellowish brown, slender and lax, stellately lepidote; foliage ample, 2-jugate or with 5 leaflets, about 2 dm long, alternatingly scattered; petiole 3 to 5 cm long, thin, comparatively slender, covered with fulvus ciliate scales in the early state, subterete, enlarged at the base; the rachis very similar in vestiture but usually a trifle shorter; petiolules 5 mm long or somewhat longer, thickened nearly the full length, caniculate along the upper side, densely covered with the same indumentum, the terminal one 3 times as long; leaflets opposite, the basal pair considerably smaller, nearly flat, mostly horizontal, submembranous, the abrupt acute to acuminate apex recurved, much deeper green on the upper glabrous surface, below also glabrous, smooth on both sides, entire, curing almost equally brown on both sides, quite variable in size and shape; the terminal blade 14 cm long without the petiolule, 6 cm wide above the middle, its lateral ones somewhat smaller but similar in shape, apex abruptly acute to subacuminate, base acute to cuneate, obovate in general outline or obovately oblong: the basal ones elliptic in shape, rounded at both ends, the apical point abrupt and sharply acute; midrib straight, raised beneath, clothed with caducous ciliate scales, caniculate on the other surface and glabrous except toward the base of the blades; nerves 7 on each side of the smaller laminae, 10 to 12 on each side of the larger laminae, ascending, tips interarched, filiform, when young beset with fugacious scales, scarcely evident from the upper surface; reticulations minute and obscure; inflorescence ascending or horizontal, flexible, axillary, usually shorter than the foliage, quite variable in size, branched from near the base or from above the middle only; the branches quite slender, divaricate and curvingly spreading, very lax, alternate; the ultimate branchlets also alternate, rather short, spreading from the base to the tip, gradually becoming reduced toward the top; the main central branch far extending beyond the lateral or basal ones, all the branchlets subtended by minute bracts or mere bract vestiges and all equally covered with the dark fulvus colored indumentum composed of numerous ciliate scales; flowers odorless, yellowish green, deciduous, globose or nearly so and appearing as if in the bud state, sessilely grouped or clustered along the short or very short ultimate branchlets; calyx more than 1 mm high, saucer shaped, divided to below the middle into 5 unequal tubes, externally covered with a testaceus stellate pubescence; the elliptic segments submembranaceous and obtusely rounded at the apex; corolla buds subglobose, 1 mm in diameter; petals 5, imbricate, subcoriaceous, glabrous on both sides, elliptic or the inner ones subcuneate toward the base, ultimately nearly free, broadly rounded at least the apex, concavo-convex, the top overarching the inner organs; stamineal tube obovoid or turbinate, coriaceous, 1.25 mm across, the margin of the truncate apex minutely apiculate, glabrous; anthers 5, inserted a trifle below the orifice and on the inner side, well extending over the orifice, 0.33 mm long, triangulaly oblong, dehiscing along the lateral sides, sessile, glabrous, subacute toward the apex; ovary minute, bearing a thick turbinately flat topped stigma.

Type specimen number 13387, collected by *A. D. E. Elmer* in moist earth among bowlders of the densely wooded banks of the Catangan creek at 1250 feet altitude, — Cabadbaran, Agusan province, Mindanao, August 1912.

A critical species when compared with *Aglaia glomerata Merr.*, but our leaflets are larger and obovately oblong in shape, subglabrous beneath except along the veins. Our inflorescence is not so densely reddish brown pubescent, the flowers less glomerated and the calyx with a different indumentum. The entire inflorescence strongly resembles the male inflorescence of certain oaks or *Quercus* species. *

Aglaia reticulata Elm. n. sp.

A 10 m high tree; wood moderately hard, reddish in the center, odorless and tasteless; old bark brown, gray on the branches, smoothish; branches spreading toward the top, the branchlets chiefly horizontal; foliage similarly spreading, 20 to 50 cm in length more or less, alternate; petiole 7 to 17 cm long, thickened at the base, otherwise terete, stout; rachis somewhat fluted, glabrate or sprinkled with rosin colored scales in the young or early state; leaflets horizontally spreading, subcoriaceous, flat, shining dark green above, much paler beneath, 4-jugate, the basal ones gradually reduced, evenly scattered, the 3 largest leaflets from the distal end, curing unequally brown on their sides, glabrous above, beneath sprinkled with rosin colored scales, entire, the margins minutely revolute, apex acute to acuminate, the base of the lower ones usually inequilateral and obtusely rounded, the terminal ones nearly equilateral and acute at the base, the basal leaflets ovately elliptic, the middle ones ovately oblong, the end blades usually obovately oblong, sometimes merely oblong; petioles 1 cm long, the terminal one twice as long or longer, grooved along the upper side, more or less thickened toward the base and scale roughened; midrib channelled along the upper surface, ridged beneath and yellowish brown lepidote; nerves faintly grooved along the upper glabrous side, 7 to 12 on each side of the midrib, quite prominent and thinly pale brown lepidote beneath, ascending, the tips of the apical ones coarsely anastamosing; reticulations in cross bars, relatively pronounced beneath, not evident above, pale brown as are the lateral nerves, only sparsely pale brown lepidote; infructescence nearly equalling the foliage, axillary, ascending. all the stalks dark green in the fresh state, more or less dotted with minute reddish brown scales, subterete, the plane sides becoming grooved toward the top, few branched from above the middle; the branches divaricate and occasionally short rebranched, quite angular toward their ends, minutely wax dotted, otherwise glabrous; fruiting pedicels 5 to 8 mm long, green and enlarged toward the old calyx bearing end, divaricate and well scattered; fruits dark green, turning light yellow and mealy when mature, curing yellowish brown, ellipsoid on the whole, 1-seeded, often laterally compressed and with 2 seeds, up to 1.5 cm long, appearing densely punctate; seed compressed, ellipsoid, blackish brown in the dry condition, 1 cm in length, linearly attached along the ventral side.

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* There are a few very similar specimens in the general herbarium of the Bureau of Science collected on Negros island and marked "*Agláia negrosensis Merr.* n. sp." This name is not listed in his Enumeration of Philippine Flowering Plants, and apparently remains unpublished. Likewise "*Agláia mindanaensis Merr.* n. sp." in manuscript is in the type collection of the bureau, but is not listed in the enumeration.

Type specimen number 10735, collected by *A. D. E. Elmer* in wet woods of steep ravines along the Baruring river at 3500 feet altitude,—Todaya, Davao district, Mindanao, May 1909.

Our specimen is readily distinguished from all other Philippine species by its very evident reticulations. It is not related to *Aglaia pallida Merr.,* but it is related to *Aglaia everettii* of the same author. The leaflets on our new species are different in shape, have a sprinkling of scales beneath and are more than bijugate. Most of all, the fruits are very distinct.

Aglaia rimosa (Blco.) Merr.

This specimen number 17709 was collected at Los Banos, Luzon, June 1917, and was distributed under *Aglaia hexandra Turcz.*

Field-note not given.

Aglaia samarensis Merr.

Numbers 17147 and 16814 were distributed under the above specific name.

Field-note for 16814 from Irosin, Luzon, July 1916:—Small erect tree in damp soil of steep wooded ravines at 1500 feet; stem 4 inches thick, terete, nearly straight, 15 feet high, branched from near the middle; wood moderately hard, reddish tinged toward the center; bark smooth, greenish gray blotched; branches ascending, rebranched, twigs ascending; leaves coriaceous, flat, with recurved points, much lighter or relatively yellowish green beneath; fruit clusters upon special branches, varying from 4 to 7 inches across and upon stout 1 to 10 inches long stalks; fruit ellipsoidally globose, 1 inch long, green, aurantiaceus and miniatus upon the same bunch, easily separating when ripe, the skin splitting from base to apex upon being squeezed, one or normally with 2 large brown seeds surrounded by a whitish meat which tastes sour and it can easily be detached or slipped from the seeds.

Aglaia sibuyanensis Elm. n. sp.

A small or medium sized tree, 10 m high and with a 2 dm thick trunk; wood quite hard, heavy, burly, reddish brown toward the center, slightly bitter, odorless; bark yellowish brown, with milky sap, scaling more or less; branches arising from above the middle, freely rebranched and widely spreading; the twigs ascending, yellowish gray at the tips, the young parts densely clothed with bran like scales, drying wrinkled; foliage chiefly horizontal, ample and alternate toward the ends of the twigs, 3 dm long or much shorter; petiole 4 to 8 cm long, slender, terete, enlarged at the very base, similarly lepidote as the young twig portion, tawny when dry; rachis similar in indumentum and obscurely caniculate along the upper side, rather thin and slender; leaflets 3 to 5-jugate, some of the smallest ones only 2-jugate, occasionally 3-foliate at the end, mostly with only 2 blades, chiefly descending, submembranous, the acute apex slightly recurved, a trifle folded upon the upper shining and much deeper green surface, curing murinus on both sides, glabrate except the midrib, opposite or subopposite, the basal ones smaller and subelliptic in shape, the upper laminae oblong and 4 by 10 cm in size but frequently much smaller, base chiefly acute and occasionally inequilateral; petiolules less than 1 cm in length, grooved above, slender, barely thickened at the base, clothed with bran like scales; midrib relatively prominent, sprinkled with caducous scales along the nether side; lateral nerves 5 to 7 on each side of the midrib, usually glabrate, quite evident beneath, ascendingly curved, scarcely evident above; reticulations none or obsolete; infructescence apparently axillary, 1 dm long, few branched from near the base or much shorter and unbranched, the divaricate stalks covered with the same light or yellowish brown scales as that on the twigs and leaf stalks; fruits pale yellow and elongated, globose when fresh. when dry obovately triangular, sometimes obovoid to subglobose, the dry nuts 2 cm long by 1.5 cm across, much constricted into a short stipe on which the remnant of the calyx remains, mostly 3-seeded, sometimes by abortion 2-seeded. rarely 1-seeded, those in my packet minutely wrinkled and avellaneus in color, each seed division with a median line or costa from base to apex.

Type specimen number 12243, collected by *A. D. E. Elmer* in stony soil of seepage wooded embankments of the Dulangan creek at 750 feet altitude,—Magallanes, Sibuyan island, April 1910.

Our leaves are very similar to *Aglaia samarensis Merr.*, but the fruits are very different. Our fruits do assimilate those of *Aglaia alternifolia Merr.* and *Aglaia llanosiana C.DC.* The former has much larger and fewer leaflets. It certainly does not match the type specimen used for *Aglaia lagunensis Merr.* So likewise it differs from *Aglaia langlassei C.DC.*

Aglaia sorsogonensis Elm. n. sp.

A burly tree; stem 6 dm thick, irregularly round, 12 m high or higher, branched from the middle; wood hard, sappy white on the outside, reddish tinged toward the center; bark yellowish brown, smooth or when old scaling in thin plates, latericius except the outside; main branches ascending, freely rebranched and forming a dense crown; young branches or twigs tough, scurfy or rusty to reddish brown; leaves alternate, ascending, up to 4 dm in length; petiole 8 cm long on my specimen, stout, subterete, gradually much thickened toward the base and longitudinally striate, rather densely clothed with an olivaceus indumentum; rachis relatively stout, terete, also covered with a similar indumentum; leaflets 5-jugate, usually 3 blades at the distal end but sometimes only 2, shallowly folded or nearly flat, curing atropurpureus to brownish beneath, the laminae portion glabrous on both sides, rigidly coriaceous, entire, the lower blades elliptic, the distal ones obovately oblong and the lateral ones oblong, apex rounded and terminated by a short acute point, the base also rounded and a trifle inequilateral, the larger of the upper leaflets 4.5 by 14 cm, the basal pair shorter but nearly as wide; petiolules 5 to 8 mm long, the terminal one of the middle leaflet 1.5 cm long, densely scale covered and fuligineus in color, stout or slightly thickened throughout, fluted along the upper side; midrib pronounced beneath, caniculate above, covered with fugacious scales but especially so along the lower side of the blades; nerves 8 to 13 on each side of the midrib according to size, subdivaricate, quite evident beneath, tips ascendingly curved, glabrate, visible from the upper side of the laminae; reticulations obscure; inflorescence somewhat rigid as the leaves, ascending, the older ones subpendant, axillary, equalling the foliage, slender or paniculately elongated, rusty or reddish brown throughout; peduncle terete, only 4 cm long on my specimen, stout, covered with a fuligineus indumentum; the rachis more or less compressed and striate when dry, similarly scale covered; branches longest at the bottom and up to 13 cm long, gradually becoming reduced, the distal ones very short, alternate and quite evenly scattered, the secondary branches arising from below the middle or toward the base, neither the primary nor the secondary branches are subtended by bracts, all of them more or less divaricately spreading, alike in vestiture; the ultimate branches covered with a darker colored indumentum, short and stout, flower bearing from near the base, occasionally subtended by short acute bracts; flowers single, in pairs or in triplets, normally subtended by apiculate bracts, upon 1.5 to 3 mm long stout pedicels which with the flowers and flower bearing branches have a darker bran like appearance; calyx 2 mm high, 0.5 mm wide across the apex, densely covered with badius colored scurfy or short stellate scales, broadly elliptic or subglobose, somewhat narrowed toward the base, very rigid, the 5 subacute teeth erect; the obovoid corolla bud a trifle exceeding the calyx, coriaceous, glabrous; petals united, forming a broad tube scarcely more than 1.5 mm high, the basal portion grown together with the calyx on the outside and with the stamineal tube on the inner side, the apical one third divided into 5 broadly rounded segments; stamineal tube 0.75 mm high, very broad, rigid, glabrous, truncate;

anthers 5, sessilely inserted near the rim of the tube, triangular, 0.33 mm long, broadly truncate at the base, blunt or obtuse at the apex, laterally dehiscent, glabrous; ovary imbedded, slightly pubescent on the apical portion, terminated by a glabrous slightly rugosely ridged stigma.

Type specimen number 15158, collected by *A. D. E. Elmer* in well drained fertile ground of the hemp region at 750 feet altitude,—Irosin, Sorsogon province, Luzon, November 1915.

This specimen is almost a facsimile of my number 21394 of British North Borneo and which *Merrill* described under *Aglaia glabrifolia.* Again, our leaves and leaflets almost match *Aglaia villamillii Merr.* from Zamboanga peninsula. Our chief differences are the ferrugineus inflorescence and pedicelled flowers.

Aglaia subviridis Elm. n. sp.

A middle sized tree; trunk 3 dm thick, terete but crooked, 10 m high more or less, chiefly branched toward the top; wood moderately hard, the thin sappy portion white, otherwise latericius, odorless and tasteless; bark of the same color except the smoothish brown surface; branches crookedly rebranched; twigs angular and greenish, suberect, comparatively slender and thin, densely grayish brown lepidote, the appressed scales composed of a small deep brown spot which is surrounded by a relatively broad lighter or grayish brown portion; leaves alternating, ascending or the older ones horizontal, up to 4 dm in length, rather crowded toward the ends of the twigs; petiole 8 to 13 cm long, slender, striate, plane and slightly grooved along the upper side, swollen at the base, covered with similar deciduous scales; rachis thinner, angularly fluted, alike in vestiture; leaves 4-jugate; leaflets coriaceous or nearly so, flat and horizontally spreading, deep green above when fresh, subviridus when dry, yellowish green beneath in the fresh state and avellaneus when dry, the longer ones 4 by 12 cm, trifoliate at the end, narrowly oblong to broadly oblanceolate or the lateral ones broadly lanceolate, the smaller or basal leajlets ovately oblong, nearly as wide as the upper ones but considerably shorter, the lower surface evenly but sparsely sprinkled with deep brown colored scales, the upper surface nearly glabrous except the fugacious scales along the sunken midrib especially toward the base of the blade, entire, gradually coming to a sharp acute to acuminate point, the base of the terminal laminae acute to narrowly cuneate, the others broadly obtuse to obliquely rounded; midrib conspicuous, more sprinkled with caducous scales giving it a darker brown color, strict from base to apex, caniculate on the upper side which ultimately becomes glabrate; nerves 9 to 13 on each side, ascending, evident from the lower side or surface but not prominent, very sparingly scale covered; petiolules 5 to 8 mm long, even the terminal one, relatively thin, dark rusty brown scale covered, deeply caniculate along the upper side; reticulations of the laminae very fine or filiform, scarcely evident from the upper side of the blade; panicle axillary, very lax, ascending and widely spreading, equalling the foliage; the peduncle enlarged at the base, similar in vestiture and equal in size to the petiole; branches alternating, slender, the lower ones longest, all angularly striate, green in the fresh condition but turning grayish brown when dry, lepidote even the calyx; flowers evenly scattered along the ultimate branchlets, divaricate and upon slender ebracteolate pedicels up to 3 to 4 mm in length; calyx salver shaped, membranous, 2 mm across when spread out, densely covered with light brown lepidote scales; the 5 lobes unequal in size, ovately elliptic, obtusely rounded at the apex, 1 mm long, the basal portion united; the corolla subglobose or obovoid, 1.5 mm high, fully 2 mm thick, coriaceous and glabrous; petals 5, well overarching the stamineal tube, more or less united at the base and adnate to the inner tube, nearly 2 mm long, the outer ones broadly elliptic, the inner ones tapering toward the base, imbricate in the bud state, apex truncate or broadly rounded, concavo-convex; stamineal tube thickly coriaceous, also glabrous or minutely white scurfy on the inner side toward the top, obovoid, rugosely folded toward the top, 1.5 mm high, a trifle wider at the minutely apiculate apex, with longitudinal fleshy folds on the inner side; anthers 5, exerted beyond the stamineal tube orifice, sessile and attached just below the rim on the inner side, oblong, 0.5 mm long, more pointed toward the inwardly curved apices, dehiscing along the lateral sides or edges; ovary minute and scale surrounded, attached to the stamen tube, with an ellipsoid glabrous stigma. "Gonodan" in Manobo.

Type specimen number 13609, collected by *A. D. E. Elmer* in very moist stony ground of a deep depression between Duros and Cawilanan peaks at 3500 feet altitude, — Cabadbaran, Agusan province, Mindanao, August 1912.

Our specimen is intermediate between *Aglaia loheri Merr.* and *Aglaia denticulata Turcz.*, the latter was founded upon 761 *Cuming*. From the former it can be readily keyed out by its smaller leaves, diffusely branched inflorescence and by the saucer shaped calyx. But apparently it is most closely related to the latter, differing in a number of minor leaf characters, but notably in the pedicelled flowers and in the difference of the indumentum.

Aglaia tarangisi Elm. n. sp.

An erect shrub or a little tree; stem 3 m high, nearly 10 cm thick, round or terete, crooked; bark brown and with gray blotches, thinly checked; wood tough, reddish tinged toward the center, odorless and tasteless; branches spreading, forming a lax rather flat crown; twigs green, lenticelled, very slender and lax, the young tips flecked with small brown stellate scales which soon disappear and the surface becomes glabrate, in the dry state less than 5 mm thick; leaves horizontally spreading, 25 to 35 cm long, alternately and widely scattered, not numerous, varying from 1 to 3-jugate on my specimen; petiole blackish brown when dry, glabrous or in the very young state covered with latericius colored minute and stellate fugacious scales, 6 cm long or twice as long, also very slender, subterete or compressed and fluted along its sides or caniculate along its upper side, scarcely thickened at the base; rachis very similar in color and vestiture, slightly thinner in size but more evidently compressed; petiolules averaging 1 cm in length, the terminal one or ones up to 3 cm long, the lateral or basal ones sometimes shorter than 1 cm, comparatively slender, glabrate when old, flattened and shallowly grooved along the upper side; blades descending, coriaceous or nearly so, flat or only slightly recurved and conduplicate on the upper shining deep green surface, relatively paler or yellowish green on the nether side or surface when fresh, in the dry state dull leather brown on both sides, glabrous, entire, opposite or subopposite, when 3-foliate the central blade upon a long petiolule and its lateral ones upon short petiolules, when terminated by 2 leaflets, one upon a long petiolule, the other upon a short petiolule, the upper or terminal laminae oblong in shape, gradually coming to a subobtuse to acute apex, most of them equilateral, the base for the lateral and basal leaflets varying from broadly obtuse to broadly rounded, the base of the middle and terminal and lateral leaflets broadly cuneate; the larger or oblong leaflets 6 cm wide across the middle, three times as long, the lower ovate to ovately oblong leaflets 5 by 8 to 9 cm large; midrib not very pronounced, glabrous, flat on the upper side;

lateral nerves 7 to 10 on each side according to the size of the laminae, obscure on the upper surface, quite evident beneath, also glabrous, slightly ascending, tips much curved upwardly and becoming obscure; reticulations scarcely visible from beneath; inflorescence axillary or subterminal, at first ascending, yellowish green but dull brown when dry, very lax and slender, glabrous throughout or here and there minutely flecked with scales, up to 2 dm long, the dry compressed peduncle one half of this length; the main branches from the middle, ascending or divaricate, ebracteolate, similarly rebranched alternately, all branches much wrinkled when dry, the ultimate branchlets filiform and well scattered divaricately; flowers very small, upon 3 to 5 mm long very slender pedicels, the apparently closed flowers somewhat fragrant; young fruits green, oblong to elliptish, shining; calyx 1.25 mm high, gradually tapering from the base to the 1.5 mm wide apex, subturbinate, subglabrous or puberulent on the outside; the 5 segments 0.75 mm long, elliptic, submembranous; petals alternating with the calyx segments, imbricate, coriaceous, glabrous, oblongish, subtruncate at both ends, the short apical point well curved toward the middle, unequal in width, averaging 0.75 mm wide and 1 to 1.25 mm in length; stamineal tube 0.75 mm long, 1 mm wide or thick, rigidly coriaceous, at the base narrowed and thinner in texture, obscurely scalloped about the orifice; anthers on the inner side and just beneath the edge of the tube, sessile, glabrous, triangular, 0.33 mm long, tapering from the board base to the apex, rigid, curved or pointed to the center; pistil very small. "Tarangisi" in Bagobo.

Type specimen number 10956, collected by *A. D. E. Elmer* in fertile soil of woodlands along the upper ridge of the Baracatan creek at 1500 feet altitude,—Todaya, Davao district, Mindanao, June 1909.

A remarkable species of *Aglaia* in having its foliage and inflorescent branches entirely glabrous. It is most nearly related to *Aglaia cumingiana Turcz.* from Pangasinan province. It differs in its non-lanceolate leaflets being twice as wide and with broadly rounded bases. A co-type specimen of 1008 *Cuming* has a more diffuse inflorescence and with slenderer pedicels. This number should have been distributed under *Aglaia tarangisi Elm.* its native Bagobo name.

Aglaia umbrina Elm. n. sp.

A very small and slender tree; stem 15 cm thick, 10 m high or shorter, few branched toward the top; main branches few, ascending or spreading; wood quite hard, white on the outside, brownish otherwise, odorless and tasteless; bark smoothish, dull brown, sappy white on the inner side; twigs 2.5 cm thick, ascendingly curved or when older horizontal, dull brown and with flecks of lighter colored lenticels; foliage horizontal or somewhat descending, 4 to 6 dm in length, alternatingly and closely set, 3 to 5-jugate, 4-jugate on my specimen; petiole 1.5 dm long, thick and strong, terete, shallowly grooved along the entire upper length, much thickened at the base, densely clothed with appressed and light brown scales; rachis also stout and terete, similar in vestiture, obscurely grooved along the upper side, straight; petiolules 1 cm long, more or less thickened for the entire length, covered with appressed fuligineus colored scales, broadly caniculate along the upper side, the lower face becoming transversely roughened or rugulose when old, leaving large orbicular scars when falling, the terminal one usually longer; leaflets mainly descending, subchartaceous, nearly flat or shallowly curved on the upper surface, yellowish green beneath when fresh, entire, curing dull or blackish brown above, isabellinus beneath, opposite, short acute to obtuse, the base broadly obtuse to rounded and usually inequilateral, subelliptic to elliptically oblong, broadly oblong to ovately oblong for the slightly smaller basal leaflets, 15 to 23 cm long without their stalks, 8 to 10 cm wide or wider across the middle, the upper surface glabrous, the nether side sprinkled with very minute darker brown appressed scales; midrib stout and straight, plane above, ridged and lepidote beneath; nerves 10 to 12 on each half of the blade, strictly ascending, parallel, obscure from the upper side, beneath relatively conspicuous and sprinkled with scales, only the ascendingly curved tips becoming obscure or obsolete reticulations fine but rather obscure; infructescence axillary, suberect, up to 2.5 dm long but frequently much shorter, few and short branched, rigid, the longer branchlets arising from near the base, apparently all covered with much appressed rusty brown scales; the short pedicels of the fruit almost as broad as long, at the distal end annularly constricted and at which point the fruits become detached and leaving a remarkable circular scar; fruits hard, melleus in the fresh state, compressed at both ends, otherwise globose, in the dry state 1.5 cm long by 2.5 cm wide, constricted at the base into a thick 2 to 3 mm long pedicel like stalk which is a part of the fruit since that portion remains on all of my fruiting specimens, clothed with a tightly appressed cupreus colored covering, sunken at the apex, more or less 10-costate or ridged from base to apex, these ridges are shallow and the depressions are smooth. "Matambalod" in Manobo.

Type specimen number 13770, collected by *A. D. E. Elmer* on steep densely wooded slopes of the Dalahion rivulet at 300 feet altitude,—Cabadbaran, Agusan province, Mindanao, September 1912.

This specimen should be critically compared with typical material of *Aglaia costata Merr.*, *Aglaia diffusi-*

flora Merr., *Aglaia grandifoliola Merr.*, and *Aglaia everettii Merr.* The two or three specimens of *Aglaia costata Merr.* from the type locality are quite characteristic. The half a dozen other specimens under the same species covers are different, although the fruits are similar but not alike. Our new segregate has broader and more elliptically shaped leaves with rounded bases, and represent the more pubescent specimens from Samar island. Of typical *Aglaia costata Merr.* and "*Aglaia mindanaensis Merr.* n. sp. in MS." there are only a few specimens of each in the herbarium, collected in the same locality by *Mrs. Mary Strong Clemens*. The specimens of both species have very similar leaves, the narrowly oblong type, but their fruits are very different.

Aglaia urdanetenis Elm. n. sp.

Small tree, its trunk 8 m high and 1.5 dm thick, subterete and somewhat crooked, branched from above the middle; wood moderately soft or hard, odorless and without taste, the white or thin sappy portion gradually changing to the roseus and even incarnatus central portion; bark nearly smooth, yellowish gray except the middle latericius part; main branches widely spreading, crookedly rebranched; the suberect twigs short, the young portion tawny colored by the finely ciliated scales, rather slender and lax; leaves 2 to 3-jugate, up to 18 cm long on my specimens but quite variable, trifoliate at the end, opposite or scattered, membranous, horizontal; petiole 2 to 3 cm long, quite slender, slightly enlarged at the base, subterete, lepidote with finely ciliate olivaceus scales, ascending; rachis quite similar in vestiture and color, only a trifle thinner; petiolules thickened toward the base, longitudinally ridged, olivaceus lepidote, averaging 5 mm long, the terminal one usually twice as long and thinner; leaflets entire, gradually tapering into the acute and recurved apex, paler or yellowish green beneath, curing nearly equally tan or brown on both sides, the base mainly obtuse to rounded, sometimes the base of the upper leaflets tapering or subattenuate, the larger ones oblong, rarely broadly oblanceolate, the basal laminae much smaller and subelliptic in shape, glabrate on both sides except the midrib beneath, the largest blades 4 by 10 cm but most of them smaller on my specimens; midrib narrowly caniculate on the upper side, the raised lower side sprinkled with ciliated scales; nerves 7 to 10 on each side, ascending, very evident from the lower side of the blade, glabrate or with a few scattered scales toward their bases along the midrib, lighter colored than the leaflet proper in the dry state; the cross bar reticulations very fine or obscure; panicles suberect, pale green when fresh, diverse in size, axillary, deep olivaceus when dry, the scales of the indumentum stellate, laxly rebranched from near the base, extremely variable from 5 cm to 2 dm in length, widely spreading proportionately, the main or longest branches arising from the short peduncle and divaricate, the secondary ones similarly rebranched and soft in texture, all the branches minutely striately angular or compressed, the peduncle 1 to 4 cm long and comparatively stout; bracts obsolete or wanting, only those subtending the pedicels with small apiculate bracts or ebracteolate; flowers flavus, odorous, most evenly scattered from near the base of the ultimate brief branchlets, not bunched or conglomerate; the 1 to 3 mm long pedicels devaricate, soft with dark olivaceus stellate scales or indumentum; calyx soft stellately brown pubescent, 0.5 mm long, 1.25 mm wide, membranous; the 5 lobes rather spreading, only united at the base, oblong, quite narrow, obtuse or subacute toward the apex; corolla subcoriaceous, similarly spreading in anthesis, glabrous; petals as many as calyx lobes and alternating with them, united at the base with the stamineal tube, at least 1.5

mm long by 1 mm wide across the middle, broadly oblong to elliptic, obtuse at both ends, nearly flat; stamineal tube flatly obovoid, 1 mm high and 1.5 mm wide across the truncate top, likewise glabrous, coriaceous; anthers dark brown, rigid, inserted upon or a trifle below the minutely apiculate orifice rim, 0.33 mm long, nearly as broad across the subtruncate base, the obtuse apex pointed toward the center, dehiscing along the lateral edges, subtriangular; the small barrel shaped ovary puberulent, bearing a minute capitate stigma. "Mata-mata" in Manobo.

Type specimen number 13668, collected by *A. D. E. Elmer* in moist humus covered more or less stony ground of a wind swept ridge of forests along the Cawilanan peak at 4000 feet altitude,—Cabadbaran, Agusan province, Mindanao, September 1912.

Our new species here proposed has affinity with *Aglaia affinis Merr.* rather than with *Aglaia diffusa* of the same author. This is a very critical group with half a dozen of other species, mere variations will throw specimens under different names. Our reduced lateral leaflets with rounded bases and pubescent midrib serve to distinguish it from either of the type specimens of the two above named species. For the same reason it cannot be classified with my number 7522 or *Aglaia banahaensis Elm.*

AMOORA Roxb.

Amoora caesifolia Elm. n. sp.

A medium sized tree; trunk 6 dm across, 15 m high, terete or wadded toward the base, quite crooked; wood soft, distinctly yellow, light, odorless and tasteless; bark thick, smoothish and dull brown or grayish mottled on the surface, otherwise latericius; main branches mostly toward the top, spreading, crookedly rebranched, the slender or elongated ultimate ones sparse and rather thick; leaves alternatingly crowded toward the ends of the branchlets, a meter long; the stout petiole plated at or near the base, glabrous, fluted and ridged longitudinally; rachis subterete, long and slender, dark or dull green, brown when dry; leaflets opposite, horizontal, nearly flat, much paler or yellowish green beneath, subcoriaceous or chartaceous to membranous, easily breaking even in the fresh state, entire, oblong or rather elliptically oblong, the basal pairs much reduced and elliptic, apex rounded and with a short triangularly shaped point, base truncately rounded, the lateral blades up to 4 dm long and 15 cm wide across the middle or just below it, the lower ones smaller in size, no doubt larger ones exist, caesius beneath, a trifle darker on the upper surface, when dry seemingly papyraceous to membranous, fragile, glabrous on both sides; petiolules 2 to 3 cm long, very strong, curing darker brown or nearly black, caniculate along the upper side, glabrous, more or less wrinkled on the lower side toward the base; midrib keeled or ridged beneath, grooved along the entire length on the upper face, also glabrous, nearly olivaceus or dark brown especially on the lower face; nerves 9 to 12 on each side of the midrib, subdivaricate or slightly ascending, deep reddish brown, smooth and glabrous, tips ascendingly curved and becoming obscure, quite evident from the upper surface of the leaflet; cross bars thread like, light brown; panicle axillary and usually descendingly curved, all the stalks dark green and irregularly angled in the fresh state, very much so in the dry state, the larger or basal portion glabrous, curing fuligineus in all parts, the younger parts puberulent; the basal branches longest, alternating, the upper ones gradually reduced, the ultimate ones bract subtended and striately wrinkled; pedicels also bracteate, rather stout and straight, 2 to 5 mm long, nearly at right angles, with an annular constriction at the distal end, yellowish brown puberulent, persistent; calyx cupular, 4 mm high, as broad across the truncate apex, narrowed toward the base, puberulent, glabrate within, leathery, thick but the apical rim thinner; corolla bud cylindric, 12 mm long besides the calyx portion, terete though costulate, yellowish gray appressed pubescent; segments 5, leathery, 15 mm long, strong, circinately reflexed nearly to the base, glabrous on the inner side, ligulate, 2 mm wide at the middle, slightly narrowed toward the apex which on its inner portion has a thickened fleshy membrane overtopping the stamineal tube in the bud state, gradually narrowed toward the base, 3 parallel veined; stamineal tube 13 mm long, gradually tapering from the base to the 3 mm thick apex, on both sides appressed yellowish hairy except at the base and the terminal appendages, coriaceous, strongly 5-veined; the 5 appendages erect, 3 mm long, 1 mm wide at least, truncate at the apex or only obscurely emarginate; stamens 5, glabrous, subsessilely inserted in the sinuses of the appendages, 3 mm long, 0.75 mm thick, linear, bifid at both ends but especially at the base; cells rugose and equalling the appendages, connective dark brown, sublaterally dehiscent, attached below the middle toward the base; style about as long as the stamineal tube, puberulent, gradually tapering toward the subcapitate stigma; sterile ovary or basal portion of style elongated, ridged longitudinally, similarly puberulent, without a disk.

Type specimen number 13487, collected by *A. D. E. Elmer* in loose soil of densely wooded ravines near a stream at 750 feet altitude,—Cabadbaran, Agusan province, Mindanao, August 1912.

Its alliance is not with *Chisocheton clementis Merr.* under which genus my specimens were distributed, but it is closely related to *Amoora cupulifera Merr.* and *Amoora* *mindorensis* of the same author. From both of his species our specimen can be distinguished by a number of characters, notably by the larger leaflets, longer petiolules. difference in the branching of the inflorescence, size and shape of the floral parts, and by our persistent pedicels with subtended bracts which are totally absent in the last named species.

Amoora conduplifolia Elm. n. sp.

A rather large tree; trunk 8 dm thick, 20 m high, branched from above the middle; wood burly, odorless and tasteless, the thin sapwood whitish, otherwise of a very rich or deep red, moderately hard; bark nearly smooth, grayish, more or less mottled; branches crookedly rebranched, the ultimate ones about 2 to 3 cm thick and suberect; leaves 5 to 7-jugate, numerously crowded at the ends of the branchlets, ascending or the lower ones horizontal, heavy, 6 dm long more or less; leaflets descending. deeply folded or conduplicate on the upper side, tips usually twisted and recurved, dark dull green and glabrous above, much lighter or yellowish green on the nether surface which in the dry condition is sprinkled with grayish white flecks, curing unequally dark or dull brown, thickly coriaceous, entire, apex gradually acute to acuminate, sometimes abruptly rounded, base inequilaterally rounded or short obtuse and inequilateral, oblong, my larger blades measuring 18 cm long by 5.5 cm wide, unsymmetrically sided, the dry folded leaflets appearing falcate, opposite, pinnate; midrib blackish brown when dry, usually a trifle curved especially toward the base, prominent, glabrous, plane above; nerves 10 to 15 on each side or half, slightly curved ascendingly toward their tips, strict and parallel, obscure but equally visible from the upper surface; cross bars with reticulations minute, very obscure or obsolete; petiolules 1.5 cm long, ascending, thickened and curved, when dry blackish brown, caniculate along the upper side, stout, finely rugose on the lower basal portion; petiole strong, straight, 15 cm long on my specimens, flat along the upper face especially toward the base, leaving large triangular scars after falling, also blackish brown when dry and glabrous, smooth, gradually becoming thicker toward the expanded base, longitudinally wrinkled; rachis very similar, caniculate along the upper face, otherwise like the petiole; fruits in small axillary clusters, upon stout woody 5 to 8 cm long or shorter brown stalks, pear shaped, up to 7 cm long, 3-seeded, yellowish white when collected, apex depressed into 3 compartments, in the dry condition very finely wrinkled, more or less covered with a dull cinnamon brown bloom; pedicels glabrous, dark brown, with small lighter brown lenticels, thick, also woody; preserved seeds reddish brown, oblong in shape, 3 cm long, one half as thick.

Type specimen number 12195, collected by *A. D. E. Elmer* in moist woods with red soil underlaid with gravelly subsoil along the Sinubang creek at 750 feet altitude,— Magallanes, Sibuyan island, April 1910.

Our new species here published has fewer jugate leaves, and the nerves and reticulations of our leaflets are not as prominent as on *Amoora aherniana Merr.* Our fruits are pear shaped with a much sunken apex, not flatly globose as a santol fruit.

Amoora macrocarpa Merr.

Number 6908 was collected on mount Mariveles, Luzon, November 1904, and was distributed under the above specific name. Its large fruits are quite characteristically covered with a soft velvety pubescence.

Field-note note given.

APHANAMIXIS Blm.

Aphanamixis apoensis Elm. n. sp.

A forest tree; trunk 6 dm thick and 16 m high; branches few, chiefly toward the top, the ultimate branchlets 3.5 cm thick and suberect; wood moderately hard, odorless and tasteless, white on the outside, reddish toward the center; bark smooth, brown, that on the branches gray, that on the twigs yellowish; twigs few, long, roughened by large triangular leaf scars, the young apical portion apparently subolivaceus puberulent; leaves alternatingly scattered along the branchlets, ascending or horizontal, varying from 9 to 15 dm in length, about 9-pinnate, usually opposite, the lower pair or pairs much reduced and extending nearly to the base of the petiole; petiole short, terete except for the groove along the upper side, woody and much thickened at the base which upper portion is deeply excavated; rachis thinner, quite slender toward the distal end, subterete, caniculate along the upper side, more or less peberulent when young; petiolules very short or none, thickened at the point of attachment, dark brown, subglabrous; leaflets of 9 opposite pairs, well scattered, ascending, slightly recurved toward the apex, coriaceous, shining deep green above, much paler green beneath, curing almost equally tan brown or the lower surface of a yellowish or dirty brown, edges entire, coriaceous, very easily breaking in the dry condition, leaflets on my specimen are mostly all from the terminal ends of the leaves, subfalcate in outline, oblong, 18 cm long, 6 to 8 cm wide across the middle, quite conspicuously unsymmetrical, very obliquely rounded at and very inequilateral toward the base, obtusely rounded at the apex and terminated into a narrow 1.5 cm long point, the sides of which point is well rolled upon the upper side of the blade and which involuted portion is regularly constricted; midrib flat above, prominent beneath, curved from the middle to the base, dark brown, smooth and glabrous; nerves 10 to 14 on each side of the midrib, also dark brown, glabrate, subdivaricate, relatively prominent, barely visible from the upper leaf surface, tips more or less interarching; reticulations and cross bars obscure, not seen from the upper face; inflorescence pendulous from the lower leaf axils, solitary, spicate, flexible, 9 dm long; peduncle 15 cm in length, dull green, compressed toward the base; the rachis similar, comparatively very slender, much roughened by elliptically shaped brown scars, the flower bearing portion obscurely ridged, glabrate or when young puberulent; flowers rigid, sessile, alternatingly scattered along the rachis, subtended by purplish margined bracts, the 3 outer segments orange red, the inner lemon yellow, with a foetid odor; calyx minutely canescent on the outside, scarcely more than 2 mm high, 6 mm across when spread out, the 5 unequal lobules unequal in size and imbricate, broadly rounded and edges more or less ciliate, flat, saucer 'shaped, the basal one half united into a thick rugose mass; corolla globose, 6 mm across, glabrate or in the early state puberulent, the inner surface entirely glabrous, completely overarching or rather enclosing the central organs; the 3 petals imbricate, broadly elliptic or rotund, thick except the overlapped margins, 7 mm across both ways, at the base more or less united with the stamineal tube; the barrel with the anthers 4 mm long, about 2 mm wider, very thick, glabrous, inwardly curved about the truncate apex, longitudinally folded on the inner side; anthers 6, included, also glabrous, the widely opened cells distinctly triangular, ovately oblong, apex mucronulate, base cordate, 2 mm long, 1.25 mm wide toward the base, attached a little below the middle to the tube, dehiscing laterally; basal portion of ovary attached to the stamineal tube, the upper free portion short but densely hairy, neck very short; stigma glabrous, very large, triangularly pyramidal; fruits globose, 2 to 3 cm long or in diameter, velvety dark red, very pretty, blackish brown when dry, base with a short thick pedicel and persistent calyx segments, apex provided with a small jet black point. "Ahtig" in Bagobo.

Type specimen number 11732, collected by *A. D. E. Elmer* in rich moist soil of humid forests south of the Baruring river at 3500 feet altitude,—Todaya, Davao district, Mindanao, July 1909.

For relationship see note under *Aphanamixis davaoensis Elm.* Several of the leaflets on my type specimens have their apical sides strongly rolled inward and regularly constricted. I am not sure whether this is a natural character of the plant or not.

Aphanamixis agusanensis Elm. n. sp.

Small tree; stem 7 m high, 2 dm thick, subterete. rather crooked, with its main branches from the middle; branches ascending, sparingly rebranched; twigs suberect, moderately thick, black when dry, glabrous, also smooth, roughened by alternating leaf scars; wood rather hard, heavy, sappy white on the outside, gradually turning reddish toward the center, odorless and tasteless; bark smoothish, blackish brown except the testaceous inner side; leaves alternating, more or less crowded toward the ends of the branchlets, 1 m long or shorter, chiefly horizontal, paripinnate; petiole relatively short, on our specimen only 12 cm long, straight, terete except for the shallow groove bordered by a pair of costae along the upper side, smooth and glabrous, blackish brown in the dry condition, gradually swollen toward the base; rachis also glabrous, quite smooth, flattened along the upper face, otherwise perfectly terete, very slender, stout; petiolules 1 to 1.5 cm long, caniculate along the upper face, slightly enlarged toward the black colored base, wrinkled when dry, also glabrous; leaflets 7 to 9 pairs, mainly descending, folded upon the upper side, yellowish green beneath when fresh, unequally brown when dry, nearly black above, leather brown beneath, subchartaceous, opposite and well scattered, glabrous, entire, unsymmetric and inequilateral at the broadly obtuse to the rounded base, cuneate for the upper leaflets, apex short acute and often sidewise curved, only the upper laminae oblong to broadly oblanceolate, 22 cm long by 7.5 cm wide across the middle or above it, most of the lower leaflets 15 cm long and nearly as wide, ovate to short ovately oblong or ovately elliptic, widest near the short obtuse to truncately rounded base, appearing very unsymmetric; midrib raised beneath, plane on the upper face, a trifle curved toward the base, dull leather brown beneath as well as on the upper side; nerves 10 for the lower broadly ovate blades, 16 for the terminal elongated blades, divaricate or suboblique, parallel, tips faintly interarching, otherwise rather prominent on the nether side, evident from the upper side; reticulations faint, evident from the lower surface only; infructescence spicate, divaricate from the leaf axils; main stalk or spike 6 dm in length, smooth and very slender, green and terete, strongly recurved or subpendant toward the tips, only the terminal one half or two thirds of its length fruit bearing, glabrous, curing nearly black; fruits up to 2 cm in diameter, subglobose in general shape, pale yellow or in the very young ones whitish, the older exposed sides turning apple red, normally 3-celled and 3-seeded, by abortion with only two or only one seed, alternatingly crowded toward the end of the spike, leaving elongated scars after falling, upon very short pedicels which bear the calyx vestiges, the maturer fruits obscurely trigonous, when dry covered with brown furfuraceous scales, the young fruits black on my specimens, dehiscing from the apex; seeds shining dark brown, surrounded by a fleshy miniatus covering. "Olagan" in Manobo.

Type specimen number 13447, collected by *A. D. E. Elmer* in stony ground or soil along the wooded banks of the Catangan stream at 750 feet altitude,— Cabadbaran, Agusan province, Mindanao, August 1912.

Leaflets upon shorter petiolules, not so elongated as in *Aphanamixis obliquifolia Elm.*, but rather inequilaterally ovate to short ovately oblong; nerves more numerous and with reticulations quite evident. Fruits likewise distinct. More distantly related to *Aphanamixis pulgarensis Elm.*

Aphanamixis coriacea Merr.

Numbers 15505, 17321 and 16054 were distributed under the above specific name.

Field-note for 16054 from Irosin, Luzon, May 1916:— Small erect tree in moist humus covered ground of dense wooded depressions at 2000 feet; stem 4 inches thick, 15 feet high, few branched above the middle; wood moderately hard, testaceus in the center; bark latericius except the smoothish brown surface; the main branches ascending, few, scarcely rebranched; leaves mostly horizontal; the rachis terete and dull green, swollen at the base; petioles ascending, the flat subchartaceous leaflets paler green beneath, the leaves at most a yard long, alternatingly scattered along the ends of the stem and branchlets; infructescence pendant, axillary, 1 to 2 feet long; red fruits ellipsoid, 1 inch across, scattered from the middle toward the tip; seeds 3.

Aphanamixis cumingiana (C.DC.) Harms

Numbers 7714, 17666, 7718 and 8182 were distributed under the above specific name. Besides these numbered specimens, two sheets were collected by me in April 1906 at Los Banos, Luzon,— one with a pistillate spike, the other with ripe fruits.

Field-note for 7714 from Lucban, Luzon, May 1907:— Erect trees, 10 feet high, in light woods at 2000 feet; bark smoothish and hard, grayish white or mottled; wood hard, reddish on the inside; main limbs few, thick and rigid; leaves clustered toward the ends of the twigs, coriaceous, shining green above, recurved and shallowly conduplicate on the upper surface; the flowering spike 1 to 3 feet long, axillary; peduncle 6 to 12 inches long, pendulous; corolla yellowish or with a tinge of red on the exterior, very thick and deciduous.

Aphanamixis davaoensis Elm. n. sp.

A medium sized forest tree; trunk 6 dm in diameter, 18 m high more or less, branched from above the middle; main branches crooked and widely spreading, only sparingly rebranched; twigs varying from 2 to 5 cm thick, terete, scar marked, brown; leaves alternatingly scattered toward the ends, widely spreading in all directions, 8 to 12 dm in length more or less, glabrous, with 9 to 11 pairs of leaflets; the petiole green, subterete and very much thickened or plated at the base, stout, terete except the flat or sunken portion along the upper side; rachis also stout and nearly terete, flattened along the upper face, smooth and glabrous, curing dull cinnamon brown; leaflets imparipinnate, opposite, divaricate and only slightly recurved, usually flat, thickly chartaceous, margins entire, dull green on the upper side, tan or shoe brown when dry, the lower surface yellowish or paler green but in the dry state reddish brown, when dry fragile and easily breaking, the basal pairs on my specimen 12 cm long by 7 cm wide across the basal portion, ovate to short ovately oblong to subelliptic, our longest blade 36 cm long by 12 cm wide across the middle, broadly oblong in shape, nearly the same width throughout, rounded toward the subobtuse to acute point, slightly unsymmetric and inequilateral at the rounded base; petiolules 1 cm long, caniculate, the basal half a trifle thickened and darker brown when dry, glabrous, finely wrinkled; midrib plane above, ridged below, reddish brown as the laminae, smooth and glabrous; nerves 7 on each side of the midrib of the smallest leaflets, 16 on each side of the largest leaflet, divaricate especially those toward the base, the upper nerves ascending, parallel, the tips abruptly ascending and anastamosing, smooth and glabrous, of a deeper or darker reddish brown, obscurely evident from the upper face of the leaflet; reticulations minute and scarcely visible; inflorescence racemosely spicate, suberect from the leaf axils, 6 to 9 dm in length, the basal one fourth without branches, terete, apparently entirely glabrous, stout, the flower bearing portion sharply angled, dark green but blackish brown when dry; branches comprised of the numerous flower bearing spikes, divaricately recurved, 10 to 15 cm long, numerous, promiscuously scattered, slender, flower bearing from the base, similar in color when fresh and when dry, enlarged and flattened at the base; buds green; the flowers alternatingly scattered, much flattened, deciduous, the outer 3 organs yellow, the inner yellowish white, sessile, glabrous except the minutely fringed calyx segments or the subtending bracts; calyx glabrous, minutely ciliate along the edges, rigidly coriaceous, 3 mm long, the basal portion constricted into a thick pedicel like stalk, the apical portion expanded, fully as broad, very obscurely trilobed or frequently with one or two small additional lobules toward the base; corolla subglobose, glabrous, 4 mm thick; the petals strongly involute, 3, very coriaceous, 3.5 mm high, nearly twice as wide, united at the base and with the stamineal tube, remaining deeply concavo-convex, subpersistent, well overarching the stamen cluster; stamineal tube 2 mm long or high, 3 mm across, obscurely triangular, the basal portion united with the petals, broadly cup shaped, thickly coriaceous, glabrous, the more or less irregular apex well overarching the anthers; stamens upon a very thick puberulent rim or disk, the 5 fertile anthers alternating with mere notches of the thick disk, 0.5 mm long and as broad, their apices scarcely reaching the stamineal tube orifice, very rigid, truncate at both ends but wider at the base, sessile and basifixed, glabrous, dehiscing laterally; sterile ovary small, triangularly ovoid, minutely 3-notched at the apex, glabrous but surrounded at the base by ciliate hairs. "Pamacalon" in Bagobo.

Type specimen number 11087, collected by *A. D. E. Elmer* in forests at 1500 feet altitude,— Todaya, Davao district, Mindanao, July 1909.

Very close to *Aphanamixis apoensis Elm.*, but the more I study and compare my materials on hand, the more I am decided to keep them separate. Our leaflets are all together too large, not so oblique at the sessile base, nor falcate in general outline. Our leaves cure a reddish brown, not a yellowish or dirty brown.

We used to think of *Aphanamixis* species as representing small slender trees, but here in the great mount Apo forested region are at least two rather large or medium sized forest trees.

Aphanamixis obliquifolia Elm. n. sp.

A slender unbranched tree, 6 m high and with an 8 cm thick stem; wood whitish, soft; bark comparatively thin, brown, quite smooth; leaves toward the top, about 20, more or less equally 10 cm apart, alternate, drooping or descending, about 15 dm in length, leaving large triangular scars after falling, with 13 pairs of leaflets, terminated by 3 leaflets; the petiole straight, stout, smooth, glabrous, terete except for the flattened upper side below the middle and especially toward the base, green but turning blackish brown when dry, much thickened at the base, scars sharply triangular with a pair of ascending prongs; rachis terete, obscurely flattened and side ridged along the upper side, slender toward the distal end, also glabrous and smooth, dark brown on my specimen; petiolules suberect or ascending, 2 cm long or the terminal one on my specimen 5 cm in length, the basal half or one third much thickened and badly wrinkled when dry, otherwise slender, caniculate above, dull brown, also glabrous; leaflets oblique and considerably inequilateral below the middle, 13 pairs from my field-notes, flat, descending to drooping, submembranous, straight, totally glabrous, dark velvety green above, lighter green beneath, of nearly equal size except the basal pair or two, narrowly oblong for most of them, the basal ones ovately subelliptic or merely ovate and 6 by 12 cm in size, the other blades averaging 25 cm long and 6 to 8 cm wide across the middle, apex rather abruptly acute to acuminate, base inequilateral, broadly obtuse for the smallest laminae, subcuneate for the others, the entire margins obscurely wavy, curing unequally brown on its two sides; midrib keeled, darker brown, strict from base to apex; nerves 9 to 12 or more on each side of the midrib on the variously sized blades, suboblique and subparallel, tips interarching, a trifle darker brown than the laminae beneath; reticulations or cross bars none or very obscure; infructescence from the third uppermost leaf axil, pendulous, upon a green rachis 9 dm long, the peduncle again as long, the basal one third of the stout peduncle flattened and somewhat twisted; the rachis with fruits terete or obscurely ridged, green but dull brown when dry, roughened by the alternating narrowly oblong scars; fruit fleshy, much wrinkled, dull red, dehiscing from apex toward the base into 3 compartments, the carpels persistent, the lining of the three cells white; the mature fruits minutely verrucose, wrinkled when dry, glabrous, 2 to 3 cm long, elliptic to obovoidly elliptic, rounded at the top, distinctly trigonous toward the short constricted base; seeds solitary in each division, black but coated with an orange red fleshy membrane; pedicel very short or none, thick; calyx remnants of wrinkled vestiges. "Kawokas" in Igorot.

Type specimen number 8924, collected by *A. D. E. Elmer* in wooded ravines west of the Sablan falls,— Baguio, Benguet province, Luzon, March 1907.

Our mature fruit of *Aphanamixis obliquifolia Elm.* is ellipsoid or obovoidly so, exocarps thick and much wrinkled, basically short constricted, top rounded, calyx segments composed of wrinkled vestiges.

Our ripe fruit of *Aphanamixis pulgarense Elm.* is globose or marble round, exocarps thin and smooth, basically not constricted, top triangularly depressed, calyx segments broadly rounded and puberulent.

Aphanamixis perrottetiana Juss.

Numbers 18258 and 17831 were collected in July 1917 at Los Banos, Luzon, and were distributed under *Amoora* and *Aphanamixis* respectively.

Field-note not given.

Aphanamixis pinatubensis Elm.

Number 22179 *Elmer* is the type specimen and was published in Leafl. Philip. Bot. IX, page 3205.

Aphanamixis pulgarensis Elm. n. sp.

A very slender or little tree, with an 8 cm thick and 7 m high stem, few branched toward the top only; wood rather soft, whitish on the outside, toward the center testaceus, odorless and without taste; bark latericius except the smooth dull brown epidermis, occasionally becoming checked; the few branches suberect or curvingly spreading; leaves also few, alternatingly scattered toward the ends of the branchlets, ascending or horizontal, 7 dm long more or less; the dry twigs hard, tough, round, 1 cm thick, smooth, drying blackish brown; the petiole on our specimen 2 dm long, subterete, stiff, straight, dull brown when dry, dark green when fresh, the upper side flat or grooved and with a pair of longitudinal costae, the groove below the middle covered with a cinnamon brown felt like tomentum, swollen or enlarged at the base; the rachis smooth and glabrous, marked by a pair of longitudinal costae along the upper side, otherwise terete; petiolules 2 cm long, the basal ones nearly 3 cm long on our specimen, slender, flattened along the upper face, strict, slightly enlarged near the base which is roughened and nearly black in the dry state; leaflets apparently 8 pairs or more numerous, oppositely scattered, terminated by a pair of leaflets, flat, ascending, subcoriaceous, deep velvety green on the lower side, glabrous, in the dry state caesius or avellaneus on the nether side, dull or dirty brown above, the entire margins only very faintly undulate or wavy, apex rather abruptly acute to short acuminate, base broadly to narrowly or slenderly cuneate, frequently a trifle inequilateral, the basal laminae equilateral, otherwise the leaflets are straight and symmetrical, the subelliptic to elliptically oblong lower blades 7 by 20 cm, the upper ones as wide but nearly 3 dm long without the petiolules, elongated oblong or narrowly oblong in shape; midrib plane above, raised beneath, smooth and glabrous, darker brown than the laminae, straight; nerves 10 to 15 on the sides of the midrib, 15 for the larger and 10 only for the smaller ones, ascending, tips ascendingly curved, more or less interarching, much deeper brown than the leaf blades, prominent beneath, evident from the upper side; reticulations few and very coarse, filiform; infructescence arising from above the leaf axils, upon flexible pendant dark green stalks 6 dm long or longer; the peduncle very slender and glabrate, only the distal young portion subolivaceous puberulent, roughened by the alternating fruit scars; fruits mainly clustered at or near the ends of the subpendant spike, globose, 2 cm in diameter, dark green or the exposed portions turning atropurpureus, 3-celled, triangularly depressed at the apex, when dry yellowish brown, the exocarps thin and smooth, subtended by a very short and thick pedicel; calyx persistent, the 5 segments broadly rounded, flat, subolivaceous puberulent; seeds shining black, 1 cm long, bean shaped except for the compressed ventral sides.

Type specimen number 13104a, collected by *A. D. E. Elmer* in humus covered moist somewhat stony ground of densely wooded flats at 250 feet altitude of mount Pulgar,—Puerto Princesa, Palawan, April 1911.

See note under *Aphanamixis obliquifolia Elm.* for differences in our fruiting specimens. Also notice the yellowish brown tomentum in the groove along the upper side of the petiole. This same curious character was observed in *Dysoxylum foxworthyi Elm.* which was also collected on Palawan island.

Aphanamixis tripetala (Blco.) Merr.

Thirty three years ago I collected number 6306 at Baguio, Luzon and which *Merrill* published as *Amoora elmeri.* It is now considered identical with *Blanco's* tripetalous species.

Field-note not given.

Aphanamixis velutina Elm. n. sp.

A small rather slender tree; stem crooked, terete, 15 cm thick, 7 m high, branched from above the middle; bark mottled, smooth or scaling, testaceus except the epidermis; wood moderately hard, tasteless and without odor, the thin sapwood white, otherwise slightly brown; main branches ascending, few, sparingly rebranched, the twigs 2 to 3 cm thick, marked by large triangular alternating scars; leaves horizontally spreading, alternating toward the ends of the ultimate branchlets, 6 to 15 dm long, the young portion at least pubescent; petiole proper 15 cm long more or less, very thick, gradually thickened toward the much enlarged base, terete except for the flat upper side, densely clothed in a soft ferruginous tomentum, with a pair of longitudinal ridges; rachis densely ferruginous tomentose, longitudinally marked by a pair of ridges along the side above, otherwise smooth and terete; leaflets opposite, descending, subchartaceous or submembranous, paler green beneath when fresh, drying nearly fulvus beneath, the upper side duller in color and puberulent, velvety pubescent on the lower face, flat, the entire margins becoming minutely involute while drying, subelliptic to elliptically or broadly oblong, fragile in the dry condition, the lower blades elliptic to orbicular, 8 by 10 cm, the larger or lateral leaflets on my specimen 13 cm wide across the middle and 3 dm in length, apex abruptly constricted into a very short acute point 1 cm long or shorter, base broad and cordate; petiolules very short or practically none, thickened and soft fulvus tomentose; midrib pronounced beneath, similar in color and vestiture, plane and puberulent on the upper surface; nerves 10 to 16 or more in the larger laminae, subdivaricate or more ascending, conspicuous beneath, evident from the upper side, similar in color and vestiture, tips much ascendingly curved, those at the base downwardly curved, those just above the basal ones at right angles to the midrib; cross bars and reticulations very faint; inflorescence erect or nearly so, terminal or from the uppermost leaf axils, 3 to 6 dm long, from 3 to 7 stalks, spicately branched to below the middle, green, flexible; peduncle stout, terete, densely short and soft ferruginous pubescent, one third the length of the entire inflorescence; branches very many, up to 12 cm long, slender, unbranched, alternate, the apical ones the shortest, soft fulvus tomentose, flower bearing from near the base which is flattened and slightly enlarged; flowers sessile, flavus, odorless, subdeciduous; calyx cup 2 mm high, 3 mm across the top, narrowed at or toward the base, densely yellowish brown pubescent on the exterior, glabrous on the inner side, the 5 short and broadly rounded segments imbricate, the entire calyx 4 mm across when spread out; corolla short ellipsoid, glabrous, free from the calyx, 5 mm long; petals 3, strongly imbricate, narrowed at the base, otherwise elliptic, deeply concavo-convex, apex truncately rounded, in the early state the basal portion adnate to the stamineal tube but eventually becoming free; stamineal tube ovoidly triangular, 4 mm long and about as wide across the base, glabrous, well enclosing the apex and leaving but a small orifice, coriaceous, smooth on the inner surface; stamens 6, in one series, completely occupying the cavity of the tube; anthers nearly 4 mm long, the widely opened cells giving it a distinctly 3-angular shape, ovately lanceolate, 1.5 mm wide at or near the obtusely rounded base, terminated by a short mucro, back plane and attached at the middle to the middle portion of the tube, all entirely included; ovary sterile, minutely pubescent, style very short; stigma as well as the style glabrous, large, triangular and elongated. "Matambolog" in Manobo.

Type specimen number 13379, collected by *A. D. E. Elmer* in wet stony soil of dense woods along the Catangan creek at 1000 feet altitude,— Cabadbaran, Agusan province, Mindanao, August 1912.

Quite distinct from *Aphanamixis pinatubensis Elm.* and from *Aphanamixis cumingiana (C.DC.) Harms.*

AZADIRACHTA Juss.

Azadirachta integrifoliola Merr.

Our specimen was distributed under the above specific name. The type was collected on Palawan, and most of the specimens in the herbarium came from that island, although a few have more recently come in from Basilan and Masbate islands. It is the first specific addition to the Indian monotypic genus.

Field-note for 12638 from Brooks Point, Palawan, March 1911:—A medium sized tree in dense humid woods of moist fertile soil at 25 feet altitude or seacoast level; stem terete, straight, 1.5 foot thick, 35 feet high or higher, branched above the middle or toward the top; wood rather hard, reddish brown in the center, sapwood white, odorless and nearly tasteless; bark gray, scaling in small plates; main branches crookedly rebranched, widely spreading, the ultimate ones suberect, from one half to one inch thick; leaves ascending, clustered toward the ends of the branchlets, varying from 6 inches to a yard in length; leaflets spreading, recurved, shining deep green above, paler green and sublucid beneath, usually curved upon the upper side; rachis and petiole terete and green, the latter thickened at the base; inflorescence ascendingly curved, all the stalks dark green; perianth segments divaricate and slightly recurved, creamy white but greenish on the outside in the bud state; stamineal tube yellowish in anthesis, green in the bud, the small anthers yellow; pistil green. "Marango" in Tagbanua.

CHISOCHETON Blm.

Chisocheton apoense Elm. n. sp.

A slender tree amidst dense forests; stem 10 m high, 2 dm thick; bark mottled, nearly smooth; branches mostly from above the middle, forming an elongated crown; branchlets comparatively thick and rather few; twigs blackish brown when dry, not very thick, rather slender, the young tips with a fine fugacious pubescence, subterete; leaves ample, alternate, 3 dm long or twice as long or the longest ones three times as long, sometimes shorter, with 9 to 13 leaflets, chartaceous, descending or horizontal, flat and widely spreading; leaflets imparipinnate or pinnate, the lateral ones opposite, the smaller basal ones early falling, also flat, tips slightly recurved, deep green on the upper glabrous side, paler on the likewise glabrous nether side or surface, curing equally brown on both sides; petiole greatly varying from 2 to 8 cm long, flat along the upper side, triangularly enlarged at the base, subterete, ultimately glabrate; rachis caniculate along the upper side, quite slender, very sparsely pubescent or subglabrous; petiolules somewhat thickened and nearly black when dry, glabrate and rugose in the dry state, 5 mm long, the terminal one at least twice as long; leaflets diverse in size and shape, the lowest ovately oblong, 3 by 6 cm or smaller the lateral laminae 15 cm long and nearly as wide, the largest leaflet before me 25 cm long by 5.5 cm wide across the middle, broadly lanceolate to linearly oblong, gradually coming to the acuminate to caudate point, the smallest ones obtuse to rounded, base inequilateral and slenderly cuneate to obtusely rounded for the smaller ones; midrib keeled beneath, plane above, glabrate on both sides; nerves conspicuous, oblique, glabrous, 8 to 12 on each side of the midrib, the bract like blade with only 5 nerves, tips ascendingly curved, also evident from the upper face; reticulations conspicuous and glabrous on both sides, only evident from the upper side, rather fine; inflorescence axillary, at least as long as the foliage, subpendulous, its branchlets arising from the middle and only 2 to 8 cm in length; the peduncle one third as long as the entire inflorescence, becoming glabrate, the slender apical portion of the main stalk finely pubescent as are also its alternating branches which are usually straight and nearly at right angles from the main stalk, the ultimate branchlets very short, olivaceous pubescent and at right angle, flower bearing from the base; flowers subtended by persistent bracts, sweetly fragrant and early falling; calyx glabrate or puberulent, 2.5 mm long, wide across the obscurely and irregularly lobed apex, somewhat narrowed at the base, glabrous on the inner side; corolla bud 8 mm long, 2 mm thick toward the apex, glabrate or pulverulent on the exterior, terete, closely adnate to the stamineal tube; the 4 segments reflexed, the basal one third remain united, apex broadly rounded and more or less thickened on the inner side, ligulate, 2 mm broad, glabrate on the inner side as well as on the outside; stamineal tube 6 mm long, glabrate on the outside, cylindric but somewhat narrowed at the middle, long hairy on the inside below the anthers, completely free from the corolla, the apical 2 mm long portion dissected into 8 linear more or less spreading appendages; anthers about the size and shape of the appendages, 2.25 mm long, 0.33 mm thick, blunt at both ends, glabrous, sessilely inserted in the sinuses of the appendages and 1.5 mm below them, subbasifixed, usually curved; style terete, a trifle longer than the stamineal tube, slender, hirsute below the middle, slightly thickened toward the subcylindric stigma; ovary minute, ciliate, surrounded by a glabrous 0.5 mm high disk. "Mabuntaco" in Bagobo.

Type specimen number 10884, collected by *A. D. E. Elmer* along a heavily forested ridge north of the Baruring river at 4000 feet altitude,— Todaya, Davao district, Mindanao, June 1909.

Closely related to *Chisocheton tetrapetalus* (*Turcz.*) *C.DC.* The leaflet bases of 822 *Cuming* are very obliquely curved, the broader side one centimeter longer than the other side and in general outline rounded, not obtuse to cuneate. Our flowers are sessile, calyces distinctly lobulate, stamineal tube with style shorter, ovary disk ciliate, not glabrous.

Chisocheton benguetense Elm. n. sp.

A tall tree 15 or more m high, its main branches from the middle, ascending and ultimately widely spreading; twigs few, stout, terete, marked by large angularly short ovate scars; brown bark roughened with brown lenticels; leaves chiefly toward the ends of the branchlets but widely separated; the petiole much thickened at the base, leaving wide and 1 to 1.5 cm long scars after falling, about one third the length of the entire leaf or shorter, hairy, comparatively slender; rachis subolivaceous pubescent especially toward its distal end, relatively thin, very slender, subterete, brown when dry; leaflets paripinnate or imparipinnate, the lateral ones well scattered, mainly opposite but sometime alternate or nearly so, thinly chartaceous, equally green on both sides, flat, horizontal or when old descending, entire, occasionally the margins a trifle undulate, curing brown on the lower softly pubescent surface, upper side nearly glabrate except the midrib, the leaflets measure from 20 to 30 cm long and 6 to 8 cm wide near the base or widest portion, nearly all the same size, oblong in general outline, apex gradually tapering to the sharply acute to acuminate to subcaudate point which in many instances is a trifle curved sidewise in the dry leaflets on my specimen, base broadly rounded to inequilateral, sometimes short obtuse and unequally sided, the cut of the blade is such as to make the basal portion the widest; petiolules ascending, 5 to 10 mm long, dirty brown pubescent, slightly thickened toward the base; midrib dividing the leaflets into slightly unequal or unsymmetrical halves, curved at the distal end, also somewhat curved toward the base, ridged and soft olivaceous pubescent beneath, also hairy along the flat upper face; nerves strict, subparallel, ascending or subdivaricate, tips ascendingly curved and reticulately united, fine but similarly pubescent only upon the nether side, 15 more or less on each side of the midrib, upper side evident and usually glabrate; the cross reticulations quite prominent, provided with soft ciliate hairs; infructescence apparently axillary and subpendant, upon a slender 3 to 5 dm long stalk which is stout, ligneous and terete, the young portion brown pubescent; fruits usually few to severally clustered from the distal end of the main stalk, from short thick divaricate branches, alternating, the branchlets also thick and similarly pubescent, upon very short and equally thick pedicels, globose, dull yellowish red or plainly red, up to 5 to 8 cm in diameter, constricted at the base into a prominent stipe, when young covered with a fine olivaceous tomentum which with maturity completely disappears, at the rounded apex usually sunken and by depressions divided into as many compartments as there are seeds in the fruit; exocarp thin, not thick and heavy, easily breaking in the dry state.

Type specimen number 8964, collected by *A. D. E. Elmer* in ravines along water courses amongst the big trees below Balete,— near Baguio, Benguet province, Luzon, March 1907.

Characterized from *Chisocheton cumingianus (C.DC.) Harms* by its globose not pyriform fruits whose exocarp is relatively thin, in *Candolle's* species it is thick, fleshy and heavy; petiole, rachis, leaf nerves beneath pubescent in ours, not as in *Cuming's* 842. Again, it is characterized from *Chisocheton fulvus Merr.* in its fruits being three to four times as large and not at all covered with a short but dense ferruginous indumentum. Besides, the apex and base character of our leaflets is very distinctive.

Chisocheton clementis Merr.

Number 11618 was distributed under the above specific name, while number 16698 was distributed as *Chisocheton vulcanicus Elm.*

Field-note for 11618 from Todaya, Mindanao, July 1909:—Tree 60 feet high, with a 3 foot thick trunk, in dense forests of a low moist flat of fertile soil at 4000 feet altitude; bark brownish or grayish mottled, on the branches smoothish, reddish brown beneath the epidermis; wood moderately hard, whitish, more or less burly, odorless and tasteless; branches widely spreading toward the top, only sparingly rebranched; leaves horizontal, alternatingly scattered along the one half inch thick twigs which are suberect, 2 to 3 feet long, 3 to 7-jugate or pinnate; the leaflets nearly flat or conduplicate on the upper deep green and shining surface, yellowish green beneath, margins undulate, thinly coriaceous; panicle ascending, axillary, all the stalks with the calyx dull green, buds yellowish green, 10 to 20 inches long, the peduncle one third as long; corolla segments greenish, thick, strongly recurved, quite fragile; stamineal tube whitish; style and stigma greenish white, ovary yellowish; flowers slightly odorous and caducous. "Apit-babaca" in Bagobo.

Chisocheton cumingianus (C.DC.) Harms

Numbers 9304, 15451 and 8169 were distributed under the above specific name.

Field-note for 9304 from Lucban, Luzon, May 1907:— A spreading tree, 25 feet high, on steep slopes of gulches at 2000 feet altitude; wood hard, whitish; bark brown, roughened or checked with much elongated lenticels, gray on the branches which are rather rigid and sparingly rebranched; leaves 1 to 2 or even 3 feet long, descending, with 5 to 8 pairs of leaflets; leaflets also descending, coriaceous, shining green above, yellowish green beneath, strongly conduplicate on the upper side; inflorescence upon 1 to 2 feet long, axillary spikes subpendulous; buds greenish yellow; flowers light cream color, with a very strong and exceptionally pleasant odor, deciduous; fruits globose, 3 inches in diameter.

Chisocheton curranii Merr.

My specimen was collected and distributed under the above specific name.

Field-note for 8828 from Baguio, Luzon, March 1907: — Spreading tree on a damp mountain slope below Irisan; stem 40 feet high, more or less branched from below the midde; wood reddish, close grained, hard; the old bark rough and scaling in plates, the younger bark smooth, conspicuously mottled with coarse white blotches; leaves coriaceous, smooth but not shining, lighter green beneath; inflorescence subterminal, its paniculate branches rough, yellowish brown, 1 to 2 feet long; nuts or fruits in hanging clusters, flattened, 2-seeded.

Chisocheton pentandrus (Blco.) Merr.

Numbers 13924, 15209, 15776, 15857, 17552, 15496 and 18285 were distributed under the above specific name; numbers 7507 and 10379 were distributed under *Chisocheton philippinus Harms;* and number 14395 was distributed as *Chisocheton sorsogonense Elm.*

Field-note for 14395 from Irosin, Luzon, October 1915:—Middle sized tree in rich damp earth of the hemp fields at about 250 feet altitude; trunk 1.5 foot thick and slightly buttressed at the base, 35 feet high or higher, subterete, branched from the middle; branchlets spreading, crooked, rigid; leaves horizontal, the pendant leaflets usually curved upon the upper darker green surface, subcoriaceous; inflorescence erect and profuse, the stalks with the calyx dull or pale green; petals yellowish green, the stamen tube white or nearly so; flowers odorless; fruits globose, one half to three quarters of an inch in diameter, dull red, covered with a short velvety persistent bloom or indumentum, base narrowly constricted. Quite variable and common in all forests.

Chisocheton tetrapetalus (Turcz.) C.DC.

Numbers 7837 and 18055 were distributed under the above specific name; number 13592 was distributed as *Chisocheton urdanetense Elm.*

Field-note for 13592 from Cabadbaran, Mindanao, August 1912:—A crooked small tree in wet stony soil of a densely wooded ravine or gorge of the Catangan creek at 1500 feet altitude; stem partly extending over the stream, very irregular round and crooked, 10 inches thick, 20 or more feet high; main branches from the middle, spreading, not numerously rebranched; wood burly, white but dingy in the center, odorless but slightly sweet; bark smooth, grayish brown mottled, testaceus except the epidermis; the ultimate branches suberect, rather long; leaves varying from a foot to a yard long, horizontal or descending, the dull green rachis quite slender and thickened at the base, alternatingly crowded toward the ends; leaflets flat but recurved, margins coarsely rugose, slightly paler beneath, subchartaceous, tips more strongly recurved; young infructescence subpendant from the leaf axils, a yard long; the basal 1 foot without fruit; rachis dark green, terete, flexible; the short branches divaricate; fruits suberect or erect, few clustered toward the ends of the branches, about 5-celled. "Gigyom" in Manobo.

CIPADESSA Blm.

Cipadessa baccifera (Roth) Miq.

Number 11782 was distributed under the above specific name; number 8727 was distributed under *Cipadessa fruticosa Blm.* Most of our specimens come in from northern Luzon, few from southern Mindanao.

Field-note for 11782 from Todaya, Mindanao, September 1909:—Shrub 15 feet high, on a dry wooded ridge at 2750 feet altitude between the junction of the Porak creek and the Sibulan river; wood odorless and tasteless, rather hard or solid, white or with a slight pinkish color toward the center; bark smooth, yellowish gray and mottled, finely lenticelled; main branches from the middle, the branchlets widely spreading and with lax suberect tips; leaves descending, the leaflets also descending, membranous, dark green above, much paler beneath, with slightly recurved tips; flowers creamy white; infructescence ascending, the stalks green; fruits when mature globose, one third of an inch thick, dark shining red, berry like.

CLEMENSIA Merr.

Clemensia macrantha Merr.

Numbers 10697 and 11082 were distributed under a new name as *Dysoxylum dehiscens Elm.*

This genus and species is now found widely scattered over Mindanao, Basilan, Tawi-tawi of the Philippines,—and only recently I collected it in British North Borneo. There appears to be quite a variation in leaves, flowers and fruits. It is not frequently collected, and it is such a cumbersome plant to prepare for a good useful herbarium specimen. For the sake of more detailed information, I reproduce the field-notes for both of my Philippine specimen numbers.

Field-note for 10697 from Todaya, Mindanao, May 1909:—Shrub 15 feet high in humid humus covered fertile soil of dense forests at 3500 feet altitude north of the Baruring river; wood white, soft, odorless and tasteless; bark smooth, brown and gray mottled; branches few, ascending; leaves spreading ascendingly, alternate, chiefly at the ends of the branches; rachis and petiole terete, rigid, the latter much thickened at the base; leaflets recurved, equally scattering from near the base although much reduced toward it, submembranous or subchartaceous, dull green above, much paler beneath, its midrib and veins yellowish; infructescence pendulous, upon 2 feet long terete one third inch thick stalks, arising from the leaf axils or from the axils of fallen leaves; fruits nearly mature, upon stout divaricate pedicels one half inch thick, yellowish brown, globose, 2 to 3 inches in diameter, mostly clustered toward the end of the stalk, normally with 5 seeds, dehiscing from the apex; meat of carpels hard, whitish, thick; seeds brown, covered along the inner sides with a yellow mealy caruncle. "Buntako" in Bagobo.

Field-note for 11082 from Todaya, Mindanao, May 1909:—Small tree in fertile dry soil of dense woods at 1500 feet altitude; stem 6 inches thick, 20 feet high, sparingly branched at the top; smooth bark brown and grayish white mottled; wood odorless and tasteless, comparatively soft and light, silvery white; branches ascending, mostly unbranched, 1.5 inch thick, brown and lenticelled; leaves ascending, alternately scattered along the branches, averaging 3 feet long; petiole green, subterete, very much thickened at the base; leaflets 13 pairs, subchartaceous, ascendingly and divaricately spreading, nearly flat with only the blunt tips recurved, paler green beneath, the basal pair much reduced and reflexed; inflorescence axillary, recurved or subpendulous, equalling or exceeding the leaves, its lower or longer branchlets 6 inches long and which are gradually reduced toward the apex; flowers erect, clustered toward the ends of the branchlets, rigid; the calyx cup yellowish green, velvety; corolla also velvety, dull yellow, thick, 1 inch long, appearing as closed even in the fallen ones. Fruit seen and collected on another tree near by, almost 3 inches thick, globose, yellowish brown, similar to mabolos. "Colagdag" in Bagobo.

DYSOXYLUM Blm.

Dysoxylum agusanense Elm. n. sp.

A small and rather crooked tree; stem subterete or very irregular at the base, 10 cm thick, 7 m high, branched from below the middle; bark dull brown and smoothish, yellowish except the epidermis; wood moderately soft, odorless and tasteless, dingy white, the thin sapwood white; main branches spreading, very laxly rebranched, the slender twigs suberect, alternatingly marked by leaf scars, the younger portion covered with umbrinus colored hairs, sprinkled throughout with small light colored lenticels or spots; petioles 8 cm long on both of my leaves, slender, gradually thickened toward the base, flat, not grooved in the axil, otherwise terete, strigose and umber colored; rachis straight, terete, similar in pubescence and color; petiolules 3 to 6 mm long, moderately stout or a trifle thickened toward the base, flattened along the upper side, hairs umber brown; leaves 2 to 3 or more dm in length, alternating from the tips of the branchlets, ascending, few; leaflets horizontal, submembranous, the entire margins somewhat undulate, tips recurved, much paler green or yellowish green beneath when fresh, drying unequally brown on both sides, the nether side of a rich umber color, glabrate, most of the leaflets unequal at the broadly obtuse to broadly rounded bases, most of our leaflets opposite or nearly so, 3 to 5-jugate, bifoliate at the apex, the base of the upper blades obtuse to subcuneate and nearly symmetrical, the apex usually curved sidewise, gradually tapering to the acute to the slenderly acuminate point, the larger one 6 by 20 cm and oblongish, the lateral ones often ovately oblong, the lowest blades ovate; midrib pronounced beneath and yellowish brown strigose, caniculate and puberulent on the upper surface; nerves 5 on each side of the midrib in the smaller and 14 on each side of the midrib in the largest blades, ascending, subfiliform, darker brown in the dry state, tips ascendingly curved and anastamosing, with a few minute hairs or glabrate; reticulations obscure; infructescent spikes greatly varying in length from 3 to 10 and up to 25 cm long, slender, sparsely brown pubescent or smooth when old, apparently axillary, green and quite flexible, descending; ripe fruits 3 cm across, smooth, bright purpureus and shining, dehiscing from apex toward the base, upon short thin pedicels and subtended by a 4-segmented calyx remnant, reddish brown when dry; seeds black, hanging from a whitish meat or hilum from the split open snow white mealy carpels. "Tawid" in Manobo.

Type specimen number 13628, collected by *A. D. E. Elmer* among bowlders or along rocky banks of the Catangan creek at 2000 feet altitude,— Cabadbaran, Agusan province, Mindanao, August 1912.

A remarkably distinct plant, no close relationship can be indicated, unless it be *Dysoxylum turczaninowii C.DC.* The various colors of the various parts of the split open fruits among the green foliage presents a most pleasing combination of colors.

Dysoxylum alternifolium Elm. n. sp.

Suberect shrubs; stems 6 to 9 cm thick, terete, branched from near the base, 3 to 5 m high or long; wood hard or nearly so, also heavy, odorless, tasteless, yellowish white except the brown colored heartwood; bark testaceus, the epidermis smooth and grayish; the largest tough branches widely spreading and quite rigid; twigs also tough, numerous, crooked or curved, yellowish gray; leaves ample, 15 to 25 cm long more or less, horizontally spreading, well scattered and alternating; petiole from 2 to 5 or even 8 cm long, sharply caniculate along the upper side, comparatively slender but rigid or stiff, otherwise subterete, swollen at the base, greenish gray or nearly so on the specimens; petiolules short, measuring 5 mm long, blackish toward the slightly thickened base, deeply grooved along the upper side; leaflets all alternate, occasionally with 2 leaflets from the distal end, chartaceous, darker green on the upper surface, tips recurved, margins more or less wavy in the fresh state, glabrous, entire, avellaneus on the lower side when dry, upper surface a little darker, apex acute to sharply acuminate, base obtuse to rounded, the larger blades 4 by 10 cm, the smaller ones 2 by 4 cm, symmetric or sometimes a trifle inequilateral, number of leaflets varying from 3 to 5 or even 7, short ovately oblong or oblongish, some of the smaller blades ovate to subelliptic; midrib keeled below, caniculate on the upper leaf surface, glabrous on both sides; nerves 5 to 8 on each side of the midrib, divaricate, very obscure; reticulations none; flowers also rigid, upon short branchlets scattered along the twigs, our specimen with a few from the lower leaf axils; spikes 5 to 15 mm long, strict, terete and stout or ligneous, short cinereous in the early or young state, roughened by the numerous closely set scars of the fallen pedicels, flower bearing from near the base; pedicels 1 to 3 mm long, divaricate, similarly pubescent, apparently falling with the calyx; the calyx shallowly cup shaped, 5 mm across when spread out, puberulent on the exterior, rigid, the 4 lobes broad toward the base and acute at the apex; corolla bud oblong, subcinereous or puberulent on the exterior, 4 mm long; petals valvate but ultimately becoming free, 4, glabrate on the inner side, 5 mm long, 1 mm wide, coriaceous but especially thickened and inwardly curved at the obtuse apex, base broadly truncate; stamineal tube 4.5 mm long, 2 mm thick, cylindric, glabrate on both sides; appendages erect, broad, 8, notched, the more or less striate segments subtruncate at the apex; anthers fully 0.75 mm long, nearly 0.5 wide, oblong, sessile, obtusely rounded at both ends, entirely glabrous, their apices 0.5 mm wide below the stamineal tube, laterally dehiscent; disk boat like, rigid, 1.5 mm long, glabrous, united at the base to the stamineal tube, apex truncate and obscurely notched or apiculate; style 3.5 mm long, hairy below the middle especially toward the base; ovary very hairy, ovoid; stigma subcapitate; fruits erect or ascending, solitary or in small groups, obovoidly globose, 2 to 3 cm long, smooth, hard, more miniatus than aurantiacus exactly, normally 4-celled; the 4 seeds bean shaped, ruber red except the aurantiacus hilum.

Type specimen numbers 13230 and 12826, collected by *A. D. E. Elmer* in crevices of wet rock ledges along the river at 750 feet altitude,— Brooks Point, Palawan, March 1911.

The leaflets of these type specimens strongly remind one of *Dysoxylum biflorum Merr.*, but their inflorescences have no comparison. Only distantly related to my *Dysoxylum revolutum.* Its short inflorescence coupled with the alternate leaflets are very odd characters for the genus.

Dysoxylum altissimum Merr.

This specimen was collected and distributed under the above specific name.

Field-note for 13162 from Puerto Princesa, Palawan, May 1911:—Quite large trees in fertile soil of dense forests at 750 feet altitude along the trail to Napsan; trunk over 2 feet thick, 40 feet high or higher, crooked, terete but conspicuously buttressed at the base, mostly branched toward the top; wood quite tough, white and with a slight reddish tinge, odorless, distinctly bitter; bark smooth, yellowish gray blotched, latericius except the epidermis; main branches spreading, repeatedly rebranched, forming a broad crown; branchlets suberect; the deep green leaf stalks horizontally spreading; leaflets descending, coriaceous, nearly flat, deep and shining green above; infructescence from the lowermost leaf axils, subpendant; stalks thick, dirty brown, few to 6 inches long, few branched; fruits irregular in shape and diverse in size, yellowish green and tinged with a reddish brown, when old entirely scurfy brown, 1 to 4 or perhaps 5-seeded, 3 inches in diameter.

Dysoxylum apoense Elm. n. sp.

A medium sized tree, 10 to 15 m high and with a 4 dm thick trunk, more or less crooked and somewhat ridged toward the ground; wood rather hard, reddish especially toward the center, odorless and without taste, quite heavy; bark brown, nearly smooth; main branches from above the middle, spreading, numerously rebranched, the ultimate ones slender; twigs thin, rufus brown and finely wrinkled longitudinally when dry, here and there marked by leaf scars, not pubescent; petiole 5 to 8 cm in length but variable with the size of the leaves, rather strong, fuligineous in color, flat along the upper side, otherwise subterete, finely striate lengthwise, glabrous; rachis more or less caniculate along the upper side, glabrous and fuligineous, similarly striate; petiolules 1 cm long or the terminal one much longer, sometimes shorter, stout, thickened below the middle and toward or at the base, deeply grooved along the upper face, much wrinkled when dry; leaves horizontal or descending, 4 to 5-jugate, alternate mostly, 2 to 3 dm long or longer; leaflets spreading, flat, coriaceous, glabrous, dull green above, lighter green beneath, similarly drying reddish brown on both sides, margins entire, alternate and opposite, terminated in 2 or 3 leaflets, only the basal leaflet broadly lanceolate, otherwise the blades are nearly of the same shape and size, the upper ones 15 cm long and 3 to 4 cm wide across the middle, the short to slender cuneate bases inequilateral, gradually acute to subacuminate, in shape from narrowly oblong to broadly lanceolate; midrib very pronounced beneath, glabrous and even darker reddish brown, caniculate on the upper leaf surface; nerves oblique, 8 to 12, fewer on the small laminae, more on the largest leaflets, obscure from both sides, filiform below, subparallel; reticulations none; inflorescence paniculate, suberect, axillary, 15 to 30 cm long, all the stalks green except the old or basal portion which is brownish even in the fresh state, in the dry state the entire inflorescence fuligineously colored; main branches ascending, rebranched from above the middle or toward the distal end; branchlets again branched and becoming very short, the ultimate ones finely cinereous and usually bract subtended; flowering pedicels persistent, 3 mm long, subtended by minute bracts, at the distal end with an annular constriction; flowers 5 to 7.5 mm long or shorter, rather rigid and succulent, deciduous, very fragrant, reddish brown when dry; calyx entirely glabrous, green when fresh, shallow cup shaped, apparently 4-lobulate, its basal portion constricted into a stipe; corolla of as many segments, creamy white, glabrous on the exterior; anthers yellowish brown, stigma red. "Magamasik" in Bagobo.

Type specimen number 10736, collected by *A. D. E. Elmer* in dense moist forests on a steep ravine along the Baruring river at 3500 feet altitude,— Todaya, Davao district, Mindanao, May 1909.

Our leaves are more jugate, leaflets narrower, inflorescence two to three times as long, flowers only one half as long as those on *Dysoxylum altissimum Merr.* The lower exterior portion of the corolla on his type specimen is pubescent, that on ours is entirely glabrous.

Dysoxylum arborescens (Blm.) Miq.

Numbers 13339, 14390, 9487, 10980, 9308, 15227, 15647, 17796, 18180, 8658, 7130 and 13150 were distributed under *Dysoxylum rubrum Merr.* which is now considered a synonym of the above specific name.

This tree is met most anywhere in our islands, and has a wide range up to 5000 feet altitude among the pines of northern Luzon to the coastal woodlands of southern Palawan and Mindanao.

Field-note for 14390 from Irosin, Luzon, October 1915:—Burly tree on creek banks of the hemp regions at 250 feet altitude; trunk 2 feet thick, 35 feet high or higher, subterete; the main branches from below the middle, ultimately numerously rebranched and spreading; wood moderately hard, whitish; bark grayish brown mottled, smoothish; leaves horizontal or descending; the leaflets recurved, very smooth on both sides, paler green beneath, light green when young; fruits bright red, subglobose, one half to one and one half inches across; seeds brown, covered with a nearly miniatus fleshy membrane, the meat of the carpels snow white. "Taba-taba" in Bicol.

Dysoxylum aurantiacum Elm. n. sp.

A large widely spreading tree; main branches reaching far and wide, the secondary ones rigid, not numerously rebranched; wood medium hard, white; bark brown, scaling in granular particles or in small very brittle plates; twigs at first green, turning yellowish brown when dry, glabrous or nearly so at the young tips, longitudinally fluted or striate on our specimens, alternately marked by large nearly oval leaf scars; leaves mainly toward the ends of the ultimate branchlets, 2 to 3 dm long, sometimes shorter and often considerably longer, alternate; petiole 5 to 12 cm long more or less, slender, swollen at the base, dull green when fresh, the upper flat side rusty brown, otherwise subglabrous, terete, obscurely striate lengthwise; rachis also very slender, longitudinally striate, caniculate along the upper side, becoming glabrate; petiolules 5 mm long, minutely pulverulent or glabrate, the upper side caniculate, rather stout; leaflets alternate, glabrous, semilucid green above, somewhat lighter beneath, subcoriaceous, entire, curing nearly equally brown on both sides, subovate to ovately oblong to short oblong, gradually coming to the sharply acuminate or subcaudately curved apex, the base very oblique, the halves of the blades ending 5 to 8 mm apart, in general outline bluntly obtuse to inequilaterally rounded, varying from 6 to 16 cm long and averaging 4 cm wide across the middle or below it, unifoliate at the end, the basal laminae are the smallest and ovate in shape; midrib slender, glabrate on both sides, gracefully curved from the base into the slender apex, thereby dividing the blades into unequal or unsymmetrical halves, drying dark or reddish brown; nerves 5 on each side of the midrib on the smaller blades, 9 on each side of the longer blades, ascending, tips obscure, more evident from the lower side, also reddish brown when dry; reticulations none; fruits 1 to several clustered in the leaf axils or in the axils of fallen leaves, upon very stout and woody stalks ranging 3 to 8 cm in length, hard, with smooth orange red or aurantiacus colored surface, obovoid, with a very short basal constriction, my larger dry fruit 6 by 8.5 cm, obscurely ridged especially toward the base, normally 2 or 4-seeded, by abortion with only 1 large seed; carpels thick, composed of punk like wood; dry seed 3.5 cm long, oblong or elongated, rounded on the back, with 2 lateral sides on the two inner faces.

Type specimen number 9165, collected by *A. D. E. Elmer* in deep gulches at 750 feet altitude,— Lucban, Tayabas province, Luzon, May 1907.

Foliage similar but not the same as those on *Dysoxylum biflorum Merr.* and *Dysoxylum bakeri Elm.*

Dysoxylum bakeri Elm. n. sp.

A slender and medium sized tree, 12 m high; trunk 3 dm thick; wood odorless and tasteless, rather hard, whitish except the reddish brown heart wood; bark quite smooth for such a large tree, brown; main branches chiefly at or toward the top, long and slender, the ultimate ones widely spreading; twigs more or less wrinkled when dry, yellowish gray mottled, glabrous or nearly so on the young apical portion; leaves ascending or horizontal, the older ones descending, alternate, varying from 1 to 3 dm long or longer and larger, bearing from a few leaflets to nearly a dozen; petiole up to 5 to 8 cm in length on my specimens, longer on the larger leaves, slender, not much enlarged at the base and leaving rounded scars after falling, shallowly grooved along the upper side, subglabrous, terete, green but musty brown in the dry state; rachis very similar, obscurely striate longitudinally, a trifle thinner than the leaf stalk; leaflets equilateral or only a very little unequally sided, similarly spreading, dark green on the upper more or less conduplicate and glabrous surface, in the fresh state the whole blade usually twisted and with a strongly recurved tip, submembranous, slightly paler green and glabrate beneath, the young ones light green, gradually tapering to the acuminate point, base obtuse to obtusely rounded, margins entire, curing dull brown on both sides, variously shaped from ovately elliptic to ovately oblong or short oblong, our larger laminae 4 by 10 dm but most of the lower ones considerably smaller, alternating or occasionally subopposite, usually with a single leaflet at the distal end; petiolules 5 mm long or shorter, glabrate, dirty brown and rather stout, with a wide and shallow groove along the upper side; midrib fairly prominent beneath especially toward the base; nerves relatively faint, ascending and descendingly curved, tips very obscure, 6 to 9 on each side of the midrib; reticulations none; infructescence 3 to 8 cm long, or on some specimens varying from 1.5 to 12 cm in length, axillary; stalks thick and woody, yellowish brown, glabrous and covered with lighter colored lenticels; fruits alternate, upon short and very thick pedicels, irregularly subglobose, with a short constriction at the base, divided into 2, 3 or 4 sunken compartments, 2.5 cm across, lemon yellow, mostly

2-celled and bearing 2 seeds, smooth and glabrous but much wrinkled in the dry specimens; seeds shining dark reddish brown. "Tubuat-cobing" in Bagobo.

Type specimen number 11565, collected by *A. D. E. Elmer* in dense woods along the Mararag creek at 5500 feet altitude,— Todaya, Davao district, Mindanao, June 1909. Named after the late *Charles Fuller Baker*.

Our small leaflets suggest an alliance with *Dysoxylum aurantiacum Elm.*, yet they are quite specifically distinct. The ripe fruits are also very different. I do not hesitate in placing both of them in the genus of *Dysoxylum*.

Dysoxylum benguetense Elm. n. sp.

A 6 m high tree; main branches from below the middle, the ultimate ones ascending; wood hard and white, bark smooth and brown; twigs subterete, glabrous, brown, spotted with yellowish lenticels; leaves 3 to 6 dm long or longer, apparently alternating, our leaf with about 10 leaflets, totally glabrous; petiole 1 to 1.5 dm long, straight, terete, only the base somewhat thickened, more or less rugose when dry especially toward the base; rachis strict, terete, glabrate, obscurely fluted longitudinally; petiolules 5 mm long, relatively very thick, grooved along the upper flat side, rugose and subscurfy below; leaflets alternate, subcoriaceous, dull and dark green above, paler on the nether side, glabrous, curing equally brown on both sides, entire, ovately oblong or broadly oblong, equilateral base broadly obtuse to obtusely rounded, apex abruptly acute to subacuminate, our largest laminae 7 by 18 cm but most of them a trifle smaller; midrib stout and straight, raised beneath, plane above, also glabrous; nerves 7 to 10 on each side of the midrib, divaricate, tips ascending and becoming obscure or obsolete, otherwise quite conspicuous beneath and evident from the upper surface; reticulations none; inflorescence racemose or spicate, greatly varying in length from 3 to 10 cm long, axillary, usually ascending, the central stalk subfructescent especially so toward the base, the young tips covered with a brown indumentum; flowers yellowish, faintly fragrant, alternatingly crowded from above the middle of the spike; pedicels divaricate, finely tomentose, 2 to 3 mm long or longer, subtended by blunt apiculate bracts, leaving conspicuous scars after falling; calyx puberulent on the outside, flat saucer shaped, 4 mm across, rigid, the basal portion short and much constricted, few mm high, rim broadly 4-dentate; buds ovoidly elongated, about 4 mm long, short cinereous pubescent; petals 4 or 5, adnate in the young state, alternating with the calyx segments, in anthesis reflexed and spreading, becoming entirely free, 5 to 6 mm long, 2 mm wide, coriaceous, broadly ligulate, base truncate, apex obtusely rounded, puberulent or short pubescent on both sides except at the base on the inner side; stamineal tube erect, 4 mm long, nearly as broad, the apical one third divided into 4 or 5 broad appendages which toward the apex are again divided, slightly puberulent on the exterior toward the apex, glabrate on the inner side, subcoriaceous; appendages irregular in size, erect, occasionally obtusely truncate but normally bifid at the apex; anthers 8, attached in the sinus of the appendages and equalling them, 1 mm long, sessile and basifixed, base truncately rounded or merely emarginate, terminated by a short mucro, oblong, 0.66 mm wide, eventually dehiscent, curved backwards, glabrous or puberulent at the base on the outside; ovary rim or disk united to the basal portion of the stamineal tube, 1 mm high, glabrous on the exterior, cup shaped, thick, puberulent on the inner side, edges rugose; ovoid ovary densely pubescent; style 2 mm long, thick, terete, similarly hairy below the middle, otherwise glabrous; stigma composed of a thick disk; young fruits erect.

Type specimen number 8838, collected by *A. D. E. Elmer* along streamlets at Sablan,—near Baguio, Benguet province, Luzon, March 1907. This number was by mistake distributed as *Dysoxylum aurantiacum Elm.*

Besides a number of minor distinctions, our specimen is recognized from *Dysoxylum hexandrum* (*Blco.*) *Merr.* by its inflorescence and flowers. Neither can it be referred to typical *Dysoxylum ramosii Merr.* Again, our leaflets are similar to *Dysoxylum leytense Merr.*, but flowers very dissimilar. So with *Dysoxylum platyphyllum* of the same author.

Dysoxylum decandrum (Blco.) Merr.

Numbers 11058, 14396, 17020 and 12668 were distributed under *Dysoxylum amooroides Miq.* Only 17929 was sent out under the above specific name.

Many of the older leaflets turn light yellow, no tinge of red, while still on the tree. It is also grown in parks.

Field-note for 11058 from Todaya, Mindanao, June 1909:—A very slender erect tree, about 75 feet high with at least a foot thick trunk in stony soil along the Baracatan creek at 1500 feet altitude; stem few branched at the top only; bark smooth, green beneath the epidermis, finely mottled; wood soft, light, white, odorless and tasteless, with an inch thick pith; branches ascending, crooked, rather short, 1 to 2 inches thick, sparingly rebranched, bearing large scars; leaves ascendingly spreading, 3 to 5 feet long; the rachis green, more or less flattened, with a very thick base one inch across and triangular in shape; leaflets divaricate or a trifle descending, when old pendant, somewhat heavy and coriaceous, 16 to 22 pairs, shallowly conduplicate on the upper dark green surface, a trifle paler beneath, some of the older leaflets turn yellow while still on the twigs; midrib and nerves greenish white; inflorescence axillary, ascending, 2 feet long, branched especially toward the base, the stalks rigid and brownish green; flowers deciduous, creamy yellow throughout, odorous. "Sarecab" in Bagobo.

Dysoxylum foxworthyi Elm. n. sp.

A little slender tree; stem subterete, 8 cm thick or thicker, its main branches arising from the middle; wood odorless and quite tasteless, dingy or yellowish white throughout, rather hard and heavy; bark castaneus, well supplied with coarse similarly colored excrescences; branches spreading, crooked, only sparingly rebranched, the slender branchlets ascendingly curved; twigs thin, green, the young tips covered with a yellowish brown pubescence, marked with alternating leaf scars; leaves crowded toward the ends of the ultimate branchlets, ascending and recurved toward their ends, 3 to 4 or 5 dm in length; petiole 1 dm long more or less, slender, strict, flat and densely covered with a yellowish brown felt or indumentum along the upper face toward the base, caniculate and melleus pubescent on the upper surface toward the distal end of the petiole, the under or rounded portion glabrate when old, somewhat thickened at or toward the base; rachis very slender, densely yellowish pubescent along the canal upon the upper surface, otherwise the terete rachis puberulent or subglabrous when old; petiolules 5 mm long, slender, slightly thickened at the base or not at all, glabrate, grooved along the upper face; leaflets horizontal or descending or the younger ones ascending, coriaceous or submembranous, deep dull green on the upper shallowly folded side, opposite to subopposite, trifoliate at the distal end, much paler beneath, light flavus beneath and yellowish brown on the upper surface, flat and glabrous, entire, narrowly oblong to lanceolate, the smallest basal ones subelliptic, the terminal leaflet oblanceolate in shape, the upper blades 3 by 10 to 12 cm, the basal 2 by 5 cm, all gradations between these extremes, apex varying from sharply acuminate to bluntly obtuse, base acute to cuneate and inequilateral; midrib of a darker yellowish brown when dry, prominent beneath, at first strigulose but soon becoming glabrous, frequently curved sidewise a trifle and with the unequal base the blade appears a little falcate; nerves filiform, subdivaricate, yellowish brown, very sparsely ciliate but soon wearing glabrous, 9 to 12 on each side of the midrib according to the size of the leaflet, tips faintly interarching; reticulations very fine or obscure; inflorescence green, divaricate from the stem or larger branches, apparently clustered, spicate or racemose, the soft yellowish brown pubescent spikes 1 to 3 cm long on my specimen, rather stout, strict, longitudinally warped in the dry state, flower bearing from near the base: pedicels divaricate, 3 mm long, straight, similarly pubescent, subtended by stubby bracts which are also pubescent; calyx 2.5 mm high, 3 mm across, soft pubescent on the outside, truncately rounded at the base; the upper 2 mm barrel shaped, easily becoming detached from the thick disk like base, apex truncate and obscurely 4-denticulate; petals 4, free, about 6 mm long, much recurved in anthesis and easily separating, ligulate, 1.25 mm wide across the truncate base, glabrous, coriaceous especially at the obtuse apex; stamineal tube nearly 5 mm long, angular, 2 mm wide across the truncate base, more or less quadrangular, glabrous except above the middle on both sides, somewhat narrowed below the appendages; all appendages subdivaricate, glabrous, about 8, 1 to 1.5 mm long, deeply notched or bifid at the apex; anthers 6, sessilely inserted in the sinus and upon the inner side of the tube, nearly 1 mm below the segments, 0.75 mm long, oblong, 0.33 mm wide, blunt or minutely notched at both ends, ventrally dehiscing; style 4 mm long, strict, ciliate below the middle, terminated by a circular disk like stigma; ovary disk truncate, 1 mm high, glabrous without, the inner surface appearing sparsely ciliate, united with the base of the stamineal tube; ovary flat, tapering to a blunt point, densely sulphur hairy; mature fruit 2.5 cm long, broadly ellipsoid in outline, 3-angled, smooth, aurantiacus in color, the inner meat portion white; stalks quite strong, olivaceus strigose, the pedicels rather short; my dried fruits long stipitate, prominently apiculate, smooth, black or nearly so, hard, the 3 ridges alternating with 3 depressions from base to apex, forming 3-seeded compartments; seeds 3, compressed, nearly black in the fresh state.

Type specimen number 12823, collected by *A. D. E. Elmer* in dry well drained soil of a forested ridge at 1000 feet altitude,— Puerto Princesa, Palawan, March 1911. Named after *Dr. F. W. Foxworthy.*

Fruits triangular as in *Dysoxylum triangulare Merr.*, but leaves with no comparison. Apparently it is in the *Cauliflorae* group, but with no close relatives. Notice the dense pubescence along the upper side of the main leaf stalk.

Dysoxylum fragrans Elm. n. sp.

A medium sized tree, 12 m high and with a 2.5 dm thick stem; wood soft, whitish throughout, tasteless but with a faint sweet odor; bark yellowish mottled, more or less lenticelled; branches arising from above the middle, ascendingly spreading, sparingly rebranched; twigs from 1.5 to 2.5 cm thick, roughened by the triangular leaf scars, yellowish gray when dry, obscurely rugose, glabrous but with dark brown lenticels; leaves clustered at the ends of the twigs, horizontally spreading, the uppermost ones much reduced, the lower ones varying from 3 to 5 dm in length, 3 to 5-jugate or with fewer pairs; petiole up to 10 cm long, subterete, glabrate, dark green but turning brown when dry, toward the base much enlarged, flat and sunken in the axil, the lower portion usually sprinkled with lenticels; rachis quite slender, brownish but dull green when fresh, subglabrate except the young tips which are dark brown tomentose; leaflets usually opposite, 3-foliate at the distal end, descending, subcoriaceous, appearing membranous and quite brittle when dry, shining green on the upper shallowly curved side or surface, yellowish so beneath, when dry dark brown on the lower side which is glabrate except the nerves and midrib, the upper surface blackish brown in the dry state and glabrous except along the midrib, greatly varying in size, the basal ones sometimes much smaller and orbicular to short elliptic in shape, edges all entire, the larger blades 5 by 15 cm but most of my specimens smaller, oblong, short acute at the apex, subsessile or upon very short puberulent petiolules, oblong to ovately oblong, the base perceptibly inequilateral and broadly rounded to subcordate, the basal portion of the terminal leaflets acute to obtuse; midrib flat above and nearly glabrate when old, beneath raised and puberulent; nerves 6 to 16 on each side of the midrib according to the size of the blades, also puberulent, divaricate, much ascending toward their tips, their axils usually provided with minute tufts of hairs, quite prominent on the nether side, obscure on the upper surface; reticulations evident from beneath; inflorescence densely clustered along the branches and in dense clusters; stalks or spikes from 1 to 3 cm long, glabrous, green but brownish black when dry, unbranched; flowers creamy white, with a strong and pleasant fragrance; pedicels crowded along the full length of the central stalk, divaricate, subfiliform, 5 mm long on an average, entirely glabrous; calyx cupular, glabrous, up to 5 mm long and as wide, broadly rounded at the base, terminated by 4 broadly rounded teeth, coarsely punctate, each segment 3-veined; petals 4, alternating with the calyx segments, nearly 15 mm long, 2 mm wide but somewhat constricted below the apex, ultimately free and widely spreading, 3-nerved, the midvein more prominent, glabrous on the inner side, apical portion much thickened and broadly rounded, truncate at the base, short but densely appressed sulphur pubescent on the outer side especially toward the top; stamineal tube 12 mm long, 3 mm thick but somewhat constricted below the apical appendages, 8-veined, glabrate on both sides, appearing roughened with elongated excrescences; appendages 8, erect, 1 mm long, almost as wide, truncately rounded at the apex; anthers as many as appendages and alternating with them, 1 mm long, 0.5 mm below the inner side of the stamineal segments, sessile, oblong, blunt at both ends, dehiscing laterally, entirely glabrous; disk 3 mm deep, cup shaped, wide, coriaceous, glabrous on both sides, truncate and minutely notched at the apex, coarsely punctate on the exterior; style 12 mm long, the basal one half thick and densely hairy, otherwise glabrous; stigma also glabrous, composed of a flattened disk 1 mm across; ovary none or sterile; fruiting stalks 3 to 7 cm long, subligneous, clustered along the branches beneath the foliage; our fruits are nearly mature, globose, 2.5 to 4 cm in diameter, yellowish and covered with a yellowish scurfy brown covering; seeds 2 or 3, surrounded by a white meat. "Lambayan" in Bagobo.

Type specimen numbers 11628 in flower and 10689 in fruit, collected by *A. D. E. Elmer* in fertile soil of humid forests at 3500 to 4000 feet altitude,— Todaya, Davao district, Mindanao, June 1909.

Numbers 10689 or the fruiting specimen should have been distributed as *Dysoxylum fragrans Elm.*, rather than under another new name. Number 11628 in flower was collected in the same general region and its sweetly fragrant flowers are only half as large as those on *Dysoxylum longiflorum Merr.*

Dysoxylum grandifolium Merr.

Whitford collected the type specimen at Atimonan in Tayabas province of Luzon. The leaves are mounted on a separate sheet from those of the flowers, the leaflets of which would suggest certain species of *Dipterocarpaceae*. Apparently it is rarely collected and possibly some of the specimens are placed under *Amoora*.

Field-note for 9305 from Lucban, Luzon, May 1907:— A tall widely spreading tree, 20 yards high, overhanging a rivulet of a very narrow and damp ravine on the Lucban side of mount Banahao; wood hard, yellowish white; bark yellowish brown, scaling in plates; branches crooked, almost horizontal, thick, sparingly rebranched; leaves horizontally spreading from the ends of the twigs, from 1 to 2 yards long; petiole very rigid, flat on the upper surface, expanded at the base into heavy thick brown corrugated appendages; leaflets 5 to 9 pairs, subcoriaceous, dark green above, much paler beneath; infructescence pendulous, upon 1 to 2 yards long peduncles which chiefly arise from the branches but occasionally from the leaf axils.

Dysoxylum lanceolatum Elm. n. sp.

A rather large forest tree, 15 m high and with a 4 dm thick trunk, subterete, branched from the middle; wood reddish brown, moderately hard, odorless and without taste, the comparatively thin sapwood whitish; bark yellowish gray, smooth; main branches widely spreading, crookedly rebranched, the ultimate ones quite long, upwardly curved, 2 to 3 cm thick, twigs thinner, reddish brown and much wrinkled in the dry state, here and there with a large orbicular leaf scar; leaves alternatingly clustered at or toward the ends of the twigs, ascending from the base, terminal portion recurved, ours 5 to 6 dm in length; petiole 1 to 1.5 dm long, green but dull or greenish brown when dry, terete except for the upper flat and caniculate side, triangularly expanded at the base, glabrous, strong and straight, leaving large scars after falling, longitudinally striate or wrinkled on the lower side toward the base; rachis gradually becoming thinner, very slender and angular above the middle, the upper face flat and caniculate, smooth and glabrous; petiolules at least 2 cm long, that of the terminal leaflet or two only half as long, very smooth, deeply channelled along the upper side, subfiliform but rigid, only slightly enlarged at the base or not at all; leaflets from 20 to 30, 24 on my specimen, descending, often conduplicate on the upper darker green surface, much paler green beneath, heavy and coriaceous, lucid on the upper surface, even in the dry state sublucid, beneath dark reddish brown, glabrous, entire, usually wavy, from linear lanceolate for the terminal ones to short lanceolate for the basal ones, the change in size and shape is gradual, the lowest laminae 7 cm long by 3 cm wide below the middle, the terminal leaflet or leaflets 10 cm long and 2 cm wide without the petiole, many blades curved sidewise toward the slenderly acuminate to setaceous top, base very unequal and obliquely obtuse to subcuneate, giving the entire blade a subfalcate appearance; midrib usually curved, keeled beneath, scooped out its entire length on the upper face, also dull or dark reddish brown; nerves 7 to 12 on each side of the midrib for variously sized leaflets, suboblique, strict, darker in color, thread like, scarcely visible; reticulations none; infructescence axillary, pendulous or nearly so, 2 to 3 dm in length, sparingly branched, the short branchlets chiefly toward the end and divaricate, all branches glabrous and nearly black when dry; pedicels 5 to 8 mm long, very thick, also glabrous, blacking in the dry state, with a narrow constriction at the distal end; fruits yellowish white or becoming brown covered, nearly black when dry, usually 2-seeded, more or less flattened, the larger ones nearly 5 cm across, the dry ones with a solitary seed subglobose or irregularly so, those with 2 seeds divided into equal halves by a wide and deep restriction.

Type specimen number 12208, collected by *A. D. E. Elmer* in red clay of a forested river bench at 1250 feet altitude,— Magallanes, Sibuyan island, April 1910.

Its alliance, no doubt, is with *Dysoxylum klemmei Merr.* and *Dysoxylum siargaoense* of the same author, but more directly to the former. *Merrill's* type specimen is in flower only, but there are ample vegetative characters for distinction.

Dysoxylum laxum Merr.

Numbers 13339 and 11084 were distributed under the above specific name.

Field-note for 13339 from Cabadbaran, Mindanao, October 1912:—Shrub like or a small crooked tree, in wet rocky and wooded stream banks of the Catangan creek at 1250 feet altitude; stem 6 inches thick, with main branches arising from near the base, 25 feet high or less, somewhat extending over the creek bed; wood moderately soft, odorless and tasteless, yellowish white; bark smooth or lenticelled, mottled; twigs ascending; foliage scattered alternatingly toward the ends of the branchlets, horizontally spreading or descending, smooth, thinly coriaceous, much paler green beneath; inflorescent stalks ascending, green, 6 to 10 inches long; calyx greenish; corolla and stamineal tube stramineus in color, the succulent 4 segments strongly recurved. "Alay" in Manobo.

Dysoxylum leytense Merr.

My specimen was collected and distributed under the above specific name.

Field-note for 13436 from Cabadbaran, Mindanao, August 1912:—Small erect tree in a very damp and densely forested rich flat at 500 feet altitude; stem 8 inches thick, subterete, rather crooked or gnarly, branched from near the middle; wood moderately soft, odorless and tasteless, the outer 2 inches dingy white, very abruptly changing to nearly ruber red heartwood; bark grayish brown or black, smoothish, sappy white except the surface; main branches ascending, the few branchlets widely spreading, the ultimate slender twigs thick and suberect; leaves alternating toward the ends of the branchlets, 2 to 4 feet long or high, the petiole much thickened at the base; leaflets horizontal, subcoriaceous, slightly paler beneath, tips recurved, folded on the upper side, margins coarsely wavy; flowers in small clusters from stem and larger branches. divaricate, the stalks green; the calyx, corolla and stamineal tube stramineus; the flowers are fragrant and deciduous; fruits pendant from short woody tubercles, the flexible stalks greenish, 1 to 2 inches thick, irregularly globose, aurantiaceus, normally 4-celled and 4-seeded. "Today" in Visayan.

Dysoxylum longiflorum Merr.

This number 9303 should have been distributed under *Dysoxylum glochidioides Elm.* instead of under *Dysoxylum fragrans Elm.*

In the Enumeration of Philippine Flowering Plants my specimens are placed under *Dysoxylum robinsonii Merr.* which species however is in my opinion the same as the older *Dysoxylum longiflorum Merr.* Neither of his types have any close resemblances to *Dysoxylum cumingianum C.DC.*

Field-note for 9303 from Lucban, Luzon, May 1907:—A tree like shrub, 15 feet high, in shallow gulches near streamlets of the woods at 3000 feet altitude; bark yellowish brown, thinly checked and lenticelled; wood whitish and moderately soft; branches sparingly rebranched, rather thick, with a large pith; leaves radially crowded toward the ends of the branches; leaflets 9 to 13 pairs, much reduced toward the base, shining green above, paler beneath; infructescence a few inches long, the fruits few to several clustered along the branches, reddish rusty brown.

Dysoxylum octandrum (Blco.) Merr.

Both of these numbers 11731 and 11707 were distributed as new varieties of *Dysoxylum schizochitodes C.DC.* which is for the present superceded by *Dysoxylum octandrum (Blco.) Merr.*

There is a great variation in the size of the leaflets of these two forest trees, both of them were collected at about 3750 feet altitude in the great mount Apo forested area.

Field-note for 11731 from Todaya, Mindanao, June 1909:—A tree 40 feet high, with a foot and one half thick trunk, in rich humus covered moist soil of woods at 3750 feet altitude, south of the Baruring river; bark brown and mixed with white blotches, smooth on the branches, minutely cracked longitudinally; wood moderately hard, white on the outside, the central portion red, tasteless but with a faint carrot odor; branches chiefly at the top, crookedly rebranched; branchlets or twigs ascending, dull green or somewhat glaucous; leaves alternating, horizontally recurved, quite heavy; leaflets subpendulous, coriaceous, deep green and shining above, paler green on the under side, obliquely curved, twisted toward the apex, margins more or less wavy, shallowly conduplicate on the upper side; panicle ascending, finally recurved, not as long as the leaves, axillary, all the stalks dull green or subglaucous; petals yellowish green; the stamineal tube creamy white; style and stigma also of the same color; the ovary greenish; flowers slightly fragrant. "Tibangar" in Bagobo.

Dysoxylum platyphyllum Merr.

Numbers 12933, 11834 and 13168 were distributed under the above specific name.

Field-note for 13168 from Puerto Princesa, Palawan, May 1911:—Small erect tree in fertile humid forests at 750 feet altitude on the trail to Napsan; stem 6 inches thick, subterete, wadded toward the base, 20 feet high, its main ascending branches arising from the middle or below it; wood soft, dingy or yellowish white, tasteless, with a disagreeable sulphureous odor; bark smooth and mottled on the surface, dingy yellowish otherwise; the main branches repeatedly rebranched, the few ultimate ones ascendingly curved; leaves horizontal, alternatingly scattered toward the ends; leaflets descending, coriaceous, paler beneath, nearly flat; infructescence from the leaf axils, ascending, averaging 6 inches long, its brownish green and thick branchlets flexible; fruits diverse in shape and size, reddish brown, 1 to 4 or even 5-seeded, subglobose in outline, the larger ones 2 inches in diameter.

Dysoxylum revolutum Elm. n. sp.

A little tree or shrub like, 2 to 5 m high or even shorter, with a straight and rigid stem; branches mostly toward the top, also comparatively rigid, the few short branchlets more lax than rigid, slender, smooth, except for the striate or wrinkled appearance in the dry state, gray, marked by large triangular brown colored and alternating leaf scars, the young tips glabrate; leaves 2 to 3 dm long, alternate, widely spreading but apical portion descending, greatly varying in size; petiole from 2 to 6 cm in length, stiff, straight, enlarged at the base, glabrous even on the flattened depression or excavation along the upper side, smooth; rachis quite slender but stiff, angular, along the upper side likewise grooved, glabrate, obscurely zig-zag from leaflet to leaflet, the young tips minutely puberulent; petiolules 5 to 8 mm long, slightly thickened and rugulose toward the base below, the upper side deeply channelled, glabrate; leaflets up to 7 on a leaf, some leaves with only a terminal pair of leaflets, alternatingly scattered, none opposite, lucid, much darker green on the upper side, rigidly coriaceous, the entire margins with a marked tendency to curl upon the nether side or revolute, broadly lanceolate to ovately oblong to narrowly oblong, quite variable in size and also in shape, the lowest blades usually smaller, the lateral ones nearly as large as the upper ones, curing equally pale brown on both sides, base acute to cuneate or from obtuse to broadly rounded, gradually tapering to the slender acuminate to caudate apex, the tips frequently slightly curved sidewise, base subsymmetric, my smallest leaflet 3 by 7 cm, the others 12 to 18 cm long and 3 to 4 cm wide at or below the middle, sometimes larger; midrib raised beneath, plane above, glabrate, sometimes a trifle curved sidewise toward the apex, similarly brown on my specimens; nerves 5 on the smaller ones, 9 on the largest ones, ascending to ascendingly curved toward their ends, brown and rather filiform on my leaflets, when more prominent below impressed on the upper side or leaf surface; fruits scattered, terminal, lateral or axillary, erect, solitary or in pairs, upon short thick scurfy brown ligneous pedicels, usually erect, much constricted toward the base, obovoid in general outline, obscurely triangular, when young covered with a dense tomentum which in the fresh state appears glaucous white and dries yellowish gray, usually divided into 3 compartments and containing 3 seeds, deeply wrinkled on my young specimens; mature fruit glabrous, ranging from 3 to 4 cm long and 2 to 3 cm wide across the top, yellow to orange red or even crimson in color.

Type specimen number 7250, collected by *A. D. E. Elmer* in dry woods of the foothills,—near Palo, Leyte, January 1906.

Since its discovery it has been picked up three times by other collectors in the hill forests of Zamboanga district of Mindanao, and once on Basilan island. The stature, foliage and fruits of all of these specimens are a pretty good match for my type. All of our specimens are in fruit which turns pale yellow to miniatus, orange red to a crimson color when mature,—presenting a conspicuous contrast to the lower or ground vegetation. The lateral, terminal or axillary flowers are up to date unknown, and I assume they are relatively inconspicuous.

In March 1923 I rediscovered this same species in fruit at Tawao, British North Borneo (see my number 20810). It was found under very similar ecological conditions and only one plant was seen. In the field I recognized it at once as my Leyte plant, and the dried material of both numbers is almost exactly the same. The field-note for my Bornean specimens reads:—Upon deep rather humid forests, an undershrub 5 feet high; stem rigid; branches mainly toward the top, also rigid, few and short rebranched; leaves spreading, lucid, much darker green above; fruits scattered, terminal, lateral or axillary, erect, pale yellow at first, hard, usually in pairs from the leaf axils, upon thick and gray colored one half of an inch long stalks, miniatus exactly, making a most striking and beautiful contrast with the spreading shining dark green leaves.

Dysoxylum rostratum Merr.

This number 10675 was distributed as *Dysoxylum apoense Elm.*, but after a more careful examination of my specimen I am obliged to refer it to *Dysoxylum rostratum Merr.*

Field-note for 10675 from Todaya, Mindanao, May 1909:—Tree 35 feet high in dense woods along a ridge of the Baruring river at 3500 feet altitude; trunk 1 foot thick; branches mainly toward the top, forming an umbrella shaped crown; wood white throughout, odorless, slightly bitter, moderately soft; bark smoothish, mottled; leaves horizontally spreading, the rachis green; leaflets dull green on the nearly flat upper surface, slightly paler beneath, subcoriaceous, the young ones green; inflorescence 1 to 2 feet long, mostly from the leaf axils, ascending; all its branches dull green; flowers deciduous, sweetly fragrant, the outer row or series of petals twistingly recurved, the inner ones forming an erect tube, all creamy white; filaments of the same color; anthers brownish yellow; style greenish, stigma deep red. "Tibangar" in Bagobo.

Dysoxylum sibuyanense Elm. n. sp.

A large or medium sized tree; trunk 4.5 dm thick, 10 or more m high, subterete though crooked; wood quite soft, whitish, odorless and tasteless; bark smooth, grayish white; branches spreading from the middle, also crooked, repeatedly branched, heavy; twigs or ultimate branches densely covered with light brown to grayish white lenticels, slender, terete, barely 5 mm thick on my specimen, the young tips soon becoming glabrate, quite flexible in the green or fresh condition; leaves alternating, 2 to 3 dm long, ascending and horizontal, diverse in size; petiole 5 cm long, often shorter or longer, dull green but dark brown when dry, glabrous and smooth, the thickened basal end lenticelled below, the upper flat side grooved; rachis smooth, thinner, also flat and grooved along the upper side, its edges rather sharply angular; petiolules 5 to 10 mm long, the terminal leaflet 2 cm long, flat, grooved along the upper side, otherwise smooth and glabrous; leaflets heavy, entirely glabrous, recurved, strongly folded on the upper extremely dark green and lucid surface, paler beneath, drying brown on both sides, greatly varying in size, 3 to 5-jugate or fewer, opposite or subopposite, usually in pairs at the distal end, margins entire, subelliptic to broadly oblong, from 5 to 18 cm long, from 4 to 8 cm wide, the basal leaflets very much smaller than the upper ones, coriaceous, similarly blackish brown on both sides, abruptly tapering into a slender point, base of the smaller laminae inequilaterally rounded, that of the larger leaflets subcuneate; midrib prominent on both sides but especially on the nether surface, smooth; nerves 5 to 9 on each side, 5 on the small ones, 9 on the larger ones, very slender, more evident beneath, ascending, tips ascendingly curved; reticulations none or very obscure; infructescence 3 to 8 cm long, arising from the leaf axils; stalks flexible when fresh, subligneous, brown and sprinkled with lighter colored lenticels; fruits mostly terminally crowded, varying from 1.5 cm to 5 cm thick on the same bunch, but apparently of different ages, irregularly subglobose, pale white on the under side, otherwise turning to a bright apple red or pale purpureus, normally 5-celled, but frequently irregular and fewer seeded. "Ayag-dahon" in Manobo.

Type specimen number 13511, collected by *A. D. E. Elmer* in very wet soil of a wooded embankment along a stagnant stream at 250 feet altitude,— Cabadbaran, Agusan province, Mindanao, August 1912.

Our leaflets are larger at the top and smaller at the base than those on *Dysoxylum altissimum Merr.* Their tips, texture and venation also present distinguishing characters. From *Dysoxylum leytense Merr.* ours is characterized by having axillary infructescences and in having fewer pairs of sharper pointed leaflets whose petiolules are twice as long. Possibly most nearly related to *Dysoxylum arborescens* (*Blco.*) *Miq.*, but our leaflets are entirely too large.

Dysoxylum sorsogonense Elm. n. sp.

A small or medium sized tree; stem 2.5 dm thick, crooked, 8 m high, round or terete, branched from below the middle; wood soft, yellowish; bark smooth, thick, grayish green, reddish on the inside; branches ascending, spreading, not numerously rebranched; twigs long, slender, glabrate, longitudinally rugulose in the dry state, the young portion dull green, less than 1 cm thick on my specimen, marked by large elliptic leaf scars; leaves chartaceous or submembranous, widely spreading, very diverse in size, 5 dm long, but usually larger or longer than on my specimen; petiole 1 dm in length or much longer, stout, flattened along the upper more or less brown colored side, otherwise subterete, glabrate, gradually thickened toward the base, more or less warped on the nether side toward the base, light brown; rachis slender, obscurely angular, glabrous and smooth, light gray on the specimen; petiolules relatively thick, sunken along the upper side, about 1 cm long or much shorter on the smaller leaflets, dull or reddish brown when dry, glabrous or sometimes the thickened portion appearing scurfy; leaflets half a dozen, more numerous on the larger leaves, alternatingly scattered, with only 1 blade or two at the top end, glabrous, entire, subelliptic to oblong, the few larger ones 12 cm by nearly 3 dm long including the petiolule, the more numerous ones 7.5 cm wide and twice as long, mainly toward the base or alternating with the larger laminae, all alternatingly scattered, curing greenish gray on both sides, equilateral, broadly obtuse at the base for the smaller ones, cuneate for the larger ones, apex short acute or at least some of the smaller ones setaceously pointed, very finely verrucose on both surfaces; midrib glabrous and reddish brown in the dry state, plane on the upper side, prominently raised beneath; nerves comparatively filiform, smooth and of the same color, ascending, tips ascendingly curved, becoming obscure, 8 to 14 on each side of the midrib according to the size of the blades; reticulations very fine or none; infructescence subpendulous, solitary or 2 to 3-clustered, upon short thick stalks from the terminal or near the terminal leaf axils; stalks woody, up to 10 cm long or much shorter, yellowish brown in the dry condition; fruits obovoidly globose, heavy, the mature ones 10 cm long, with a scurfy light cinnamon brown, in the young state densely covered with lenticels and small excrescences, much warped in the dry specimens; seed 5 cm long, reddish brown in my packet, ellipsoid but somewhat flattened on the inner yellowish white surfaces, light ruber when fresh, its surrounding meat yellowish white.

Type specimen number 14604, collected by *A. D. E. Elmer* in very wet stony soil of a densely humid forested depression at 1000 feet altitude or higher,— Irosin, Sorsogon province, Luzon, October 1915.

The fruit of our specimen fairly well matches *Chisocheton cumingianus (C.DC.) Harms,* but the leaves represent a different species, either in *Dysoxylum* or *Chisocheton.* Most of our Philippine species of *Chisocheton* have opposite or near opposite leaflets.

Dysoxylum sulphureum Elm. n. sp.

A slender tree 8 m high and with an 18 cm thick stem; wood heavy, finely grained, yellowish white, moderately hard and tough, odorless and tastesless; bark gray or yellowish, smooth or only thinly checked; branches mostly toward the top, copiously rebranched, the branchlets slender; twig ends 5 to 8 mm thick or thicker, roughened by the old leaf scars, the young tips sulphureus but densely covered with dark or reddish brown lenticels, which covering turns nearly black when old; leaves spreading, coriaceous, 2 to 4 dm in length; petiole comparatively short, 4 to 6 cm long on my specimens, possibly longer on larger leaves, the flattened upper side with sharp lateral ridges, the base triangular and more or less enlarged, sulphureus, glabrous when old, occasionally sprinkled with wax colored lenticels; rachis terete, shallowly caniculate along the upper side, similar in color and provided with similar lenticels, in the young or early stage usually strigose, rather slender as is also the petiole; petiolules 5 mm long, thin throughout, obscurely grooved above or along the upper side, yellowish or more brown toward the base, strigosely hairy, that of the terminal leaflet very slender and 2 cm in length or longer; leaflets 3 to 5-jugate, mainly opposite, 3 from the distal end, the apical blades are much longer than the basal ones which sometimes are no more than foliaceous bracts, the lateral laminae average 4.5 cm wide by 12 cm long, the terminal or upper pair of blades as much as 20 cm long by 8 cm wide above the middle and which are oblanceolately oblong, the lateral ones are merely oblong, the lowest ones elliptic to orbicular, the lower half of the leaflets are broadly rounded and inequilateral, the base of the upper leaflets are obtuse, that of the terminal blade slenderly cuneate, the larger terminal blades have more symmetric bases or are altogether symmetric, apex rounded and with short acute tips, entire, glabrous, nearly flat or shallowly conduplicate on the upper dark green surface, paler and yellowish green beneath, submembranous or subchartaceous; midrib ridged and strigulose beneath, plane and glabrous on the upper leaf surface, when dry subsulphureus on both sides or more so on the upper leaf surface; nerves 7 on each side for the average leaflets, about half as many on the much reduced basal ones, as many as 12 on the terminal or largest laminae, subdivaricate or ascending, tips ascendingly curved and becoming obscure, sulphur yellow as is also the midrib in the dry state, sparsely strigulose; reticulations scarcely evident; racemose spikes in scattered clusters along the larger branches, varying from 1 to 3 cm long, angular when dry, yellowish brown, strigosely pubescent, rather stout and straight, green and pliable when fresh, flower bearing from the base to apex; pedicels of old flowers strictly ascending, persistent, 3 mm long, subtended by a scoop shaped bract, all similarly pubescent, alternate and more or less crowded; calyx 3 mm across both ways, broadly truncate at the base, obscurely 4-apiculate; corolla and stamineal tube fallen, apparently with 4 petals; ovary flatly ovoid, circular upon the disk like calyx, densely covered with sulphureus hairs, terminated into a very short blunt terete point or stigmatic portion; nuts or fruits brown, 1.5 cm in diameter, globose, smooth, reddish brown on our specimen, sometimes sprinkled with lighter colored spots or lenticels, upon 3 to 5 mm long pedicels which are thick and very much wrinkled in the dry state.

Type specimen number 10928, collected by *A. D. E. Elmer* in dense woods or forests along the Baracatan creek at 1500 feet altitude,— Todaya, Davao district, Mindanao, June 1909.

The leaves are practically the same as on *Dysoxylum testaceum Elm.* which is in fruit only. The fruits on our new species here proposed are, however, of a different kind. My old inflorescences are quite distinct from *Dysoxylum cumingianum C.DC.*, neither are our leaflets the same as those of 1411 *Cuming.*

Dysoxylum testaceum Elm.

Number 17886 *Elmer* is the type specimen and was published in Leafl. Philip. Bot. VIII, page 3093.

Many of the specimens in the herbarium marked *Dysoxylum cumingianum C.DC.* do not exactly match typical 1411 *Cuming.* Even without flowers I am inclined to think my specimens from Los Banos as distinct from *Cuming's* specimen. Furthermore, I also think it distinct from my Todaya specimens.

Dysoxylum wenzelii Merr.

Numbers 15700 and 17211 were collected at Irosin, Luzon, September 1916, and were distributed under the above specific name.

Field-note not given.

HEYNEA Roxb.

Heynea sumatrana Miq.

Type specimen number 9179 for *Scutinanthe engleri Elm.* was collected at Lucban, Luzon, May 1907, and was published in Leafl. Philip. Bot. I, page 298. It is apparently common on Basilan island.

Field-note for 14054 from Cabadbaran, Mindanao, October 1912:—Small suberect tree in red soil of steep wooded embankments in the humid saddle at 3500 feet altitude between Duros and Cawilanan peaks; stem 6 inches thick, subterete, crooked, 20 feet high, branched from the middle; wood white, soft and pulpy, odorless and tasteless; bark brown or grayish mottled, smooth, the middle portion white as the wood, the inner side yellowish; branchlets few, ascending, angular, green; leaves spreading, strongly recurved and drooping; the leaflets coriaceous, lucid dark green above, shallowly folded and strongly recurved toward the apex, very smooth on both sides, glaucous green beneath; infructescence axillary, drooping, the flexible stalks reddish; fruits obovoidly globose, also tinged with a shade of red; seeds solitary. "Bahay" in Manobo.

LANSIUM Corr.

Lansium domesticum Corr.

Our specimen was distributed under the above specific name. This tree is primarily found in woods along the eastern or Pacific side of the Philippine Archipelago, and in my opinion it is indigenous.

Field-note for 11211 from Todaya, Mindanao, July 1909:—A strict tree in dry wooded gulches along streamlets at 1000 feet altitude; stem 8 inches thick, 25 feet or more in height, branched toward the top only; wood moderately hard, burly, whitish or brown toward the center; bark smooth, grayish white, more or less mottled; branches freely rebranched, forming a dense crown, the twigs yellowish gray; petioles thickened at the base, similar in color; leaves coriaceous, lucid dark green above, much paler beneath, conduplicate and recurved; fruits hanging from the branches, solitary or severally clustered; spikes also unbranched, 3 to 7 inches long; young fruits 1 inch long, short ellipsoid, the thick creamy white skin containing latex; seeds usually few or by abortion single, surrounded by white edible meat, dark velvety green and bitter. "Tubua" in Bagobo, but fruit dealers know it by its common name "Lansones."

Lansium dubium Merr.

Numbers 15890 and 15198 were distributed under the above specific name.

Field-note for 15890 from Irosin, Luzon, April 1916:—A slender undershrub in moist gravelly earth of steep densely wooded ravines at 1000 feet altitude; stem at least 1.5 inch thick, 10 feet high, terete, branched toward the top; wood nearly white, tough or hard, odorless, without taste, pith quite large; bark greenish brown, smooth, isabellinus except the skin; main branches ascending, laxly rebranched; leaves not numerous, subcoriaceous, lighter green beneath, horizontal, strongly recurved; fruit short but perfectly ellipsoid, one half inch long, "Longsones" or white colored; seed usually solitary, comparatively large, surrounded by juicy white meat.

MELIA Linn.

Melia azedarach Linn.

Number 17432 was collected at Montalban, Luzon, March 1917, and was distributed under the above specific name. It is an ornamental shrub with bluish flowers and is sometimes called the "Philippine Lilac."

Field-note not given.

Melia dubia Cav.

This specimen was distributed under *Melia candollei Juss.*

Field-note for 9764 from Dumaguete, Negros, April 1908:—Tree, 50 to 75 feet high, in gulches at 2500 feet altitude; trunk 3 to 5 feet in diameter, strongly wadded, rather short or soon dividing into main branches; branches sparingly rebranched but widely spreading, the ultimate ones suberect, rather crooked; wood not hard, odorless, the outer 1 to 2 inches maple white, the inner rusty brown; old bark thick, checked into conspicuous longitudinally interlaced scales, gray, the inner half sappy white, the outer half beneath the epidermis dry and reddish, that portion of the bark on the twigs brown and smooth, lenticelled on the branches; leaves also spreading, leaving raised scars after falling, subpendulous; the leaflets thin, smooth, darker green above, conduplicate on the upper side, edges crinkled; inflorescence ascending from the lower leaf axils, suberect, all the stalks green; calyx yellowish; cŏrolla pure white, recurved and strongly conduplicate toward the base: filamentous tube dark purple; ovary and style green, stigma yellowish; no odor, but the showy flowers with tufts of foliage at the ends of the relatively few twigs give the tree a pretty appearance. "Bagaluga" in Visayan.

MUNRONIA Wight

Munronia humilis (Blco.) Harms

This number 7798 was collected at Lucban, Luzon, May 1907, and was distributed under *Turraea humilis (Blco.) Merr.*

Field-note not given.

REINWARDTIODENDRON Koord.

Reinwardtiodendron celebicum Koord.

My specimen was distributed under *Reinwardtia* *merrillii Perk.*,— a mistake in the writing of the genus name and in the determination of its species.

Field-note for 13927 from Cabadbaran, Mindanao, September 1912:—A small or little tree in fertile soil of woods among hemp fields along the trail from Bayabas to Cabadbaran at about 500 feet altitude; wood hard and burly, dingy white or white and yellowish tinged, slightly sweet, odorless; bark grayish white, scaling in irregular plates, yellowish white otherwise; stem 1.5 foot thick, crooked and irregularly round, 35 feet high at least, branched from the middle, buttressed toward the base; main branches ascending, ultimately numerously rebranched; twigs suberect; leaves descending, sharply folded and strongly recurved, thinly coriaceous, a trifle paler green beneath; inflorescence erect, the stalks green, the odorless bud like flowers deep sulphureus. "Doko" in Manobo.

SANDORICUM Cav.

Sandoricum indicum Cav.

Numbers 15807, 16894, 7712, 8164 and 12141a were distributed under the above specific name.

This tree is commonly grown for its edible fruits, and it thrives in relatively small building lots. The fruits are pale to dull yellow in color and compressed globose in shape. They can be eaten raw, but usually they are cooked to a sauce or boiled into a jam. It is one of our few trees, part of whose leaves turn red when old and ready to fall, not because of frost but for some other reason. "Hansoy" in Visayan, but all fruit dealers know it as "Santol".

Field-note for 12141a from Magallanes, Sibuyan island, April 1910:—Medium sized tree in fertile humus covered soil in light woods of pastures along the Pauala river flat at 500 feet altitude; stem burly, 2 feet thick, 30 feet high, divided from below the middle into branches; wood bitterish, odorless, quite hard and burly, whitish on the outside, reddish tinged toward the center; bark thick, gray mottled, smoothish or lenticelled, the outer half beneath the epidermis reddish, the inner portion much paler red; branchlets widely spreading, crookedly rebranched; leaves coriaceous, also spreading, quite variable; leaflets shining deep green on the upper folded surface, paler green beneath; inflorescence slightly odorous, ascending, axillary, green, the corolla segments paler green, the stamens and style yellowish, the stigma white.

Sandoricum vidalii Merr.

Numbers 12631 and 17060 were distributed under the above specific name.

Field-note for 12631 from Brooks Point, Palawan, March 1911:—A small or medium sized tree in wet gravelly soil of woods bordering mangrove marshes near the sea; stem 2 feet thick, 40 feet high, with its main branches arising from the middle, terete yet obscurely undulate; wood moderately soft, the thin sapwood nearly white, otherwise tinged with red, tasteless, with a distinct lead pencil odor, fine for cabinet workers, splitting straight; bark yellowish gray blotched, smooth, brownish beneath the epidermis; branches spreading, lax; leaves similarly spreading, chartaceous, lucid and much deeper green on the upper nearly flat surface, the young leaves yellowish green, the older leaflets occasionally turning red; inflorescence ascending or divaricately spreading, all the branches dark green and flexible; calyx and corolla green or greenish, the latter segments strongly reflexed and paler green; pistil creamy white except the greenish stigma; monodelphous stamens pale or watery white, the anthers brownish yellow or yellowish gray. "Ahojan" in Tagbanua.

TOONA Roem.

Toona calantas Merr. and **Rlf.**

Number 15471 was collected at Irosin, Luzon, November 1915, and was distributed as *Toona philippinense Elm.* from the same region in which number 15427 was collected. I have finally decided to keep it under the above specific name.

"Calantas" is a well known commercial name for the wood it represents and which is used by cabinet makers for many articles, but its chief use is in the local manufacture of cigar boxes.

Field-note not given.

Toona philippinense Elm. n. sp.

Tree with 1 cm thick twigs which are glabrous but marked with leaf scars and lenticels; leaves varying from 2 to 4 dm long, alternatingly crowded from the twig ends; petiole 5 to 8 cm long, terete or subterete, strict, purplish brown on my specimen, smooth and glabrous, flattened on the upper side toward the base, gradually thickened toward the base, more or less provided with a linear ridge along each side, glabrous; rachis thinner especially toward the distal end of the leaf, narrowly grooved along the upper side, smooth and finely pubescent, similar in color to the petiole when dry; petiolules 3 to 5 or more mm long, very thin throughout, usually somewhat recurved, caniculate and puberulent along the upper side; leaflets 5 to 9 pairs, 2 or 3 blades terminating the leaf, the basal ones much reduced, entire, glabrous, curing paler brown beneath, the base truncately rounded, occasionally subcordate, a trifle unequal at the petiolule, but most of the blades equally sided, membranous, apex rounded and frequently terminated in a blunt point, ovate to short oblong or subelliptic, the average laminae 4 cm wide across the middle or below it, 8 cm long, most of them smaller than larger, the basal blades often bract like and only 2.5 cm in length; midrib reddish brown, narrow, plane above, puberulent when young beneath; nerves 5 to 7 or fewer on the smallest laminae, ascendingly curved especially toward their tips, quite evident from the upper face, their axils often with small tuftlets of hairs; reticulations very fine and very minute; inflorescence on my specimen 2.5 dm long, terminal, lax and laxly rebranched, glabrate or the final or ultimate divisions puberulent, the main stalk and branches angular or twistingly compressed when dry, alternatingly branched from near the base, the lower branches very slender and 12 cm long, gradually reduced toward the top, divaricate or at right angles to the central main stalk, rebranched from the middle, the branchlets also divaricate and very short toward their ends, all ebracteate; flowers well scattered upon 3 to 4 mm long and subolivaceous puberulent pedicels; calyx glabrate on both sides or puberulent on the outside, saucer shaped, nearly 4 mm across, bluntly 5-toothed, edges occasionally finely ciliate, the lobed portion usually with 3 parallel veins; petals 5, free, imbricate in the early state, oblong to subelliptic, 3.5 mm long, nearly 2 mm wide across the middle, obtusely rounded at the apex or subacute, 3-veined at the base, the lateral ones short, the midvein clear to the apex but with distinct reticulate nerves on the sides, glabrous on the outside, sparsely hairy on the inner surface; stamens 5, erect or much ascending; filaments very slender, glabrous, 2.5 mm long, inserted upon the ciliate very thick ovary disk; anther 1 mm long, oblong, 0.75 mm wide, bilobed at the base, apex broadly rounded, more or less flattened, glabrous, attached below the middle or at the sinus, laterally dehiscent; ovary none or sterile; style 2 to 3 mm long, glabrous, coriaceous; stigma composed of a large thick disk.

Type specimen number 15427, collected by *A. D. E. Elmer*,—Irosin, Sorsogon province, Luzon, November 1915.

Leaflets are smaller, more membranous, nearly equilateral, and with altogether different bases and apices from those on *Toona calantas Merr.* and *Rlf.* and *Toona paucijuga Merr.*

VAVAEA Benth.

Vavaea amicorum Benth.

Numbers 16475 and 14941 were distributed as *Vavaea luzonensis Elm.* or *Vavaea sorsogonensis Elm.* (an error has occurred); number 12970 was distributed under *Vavaea harveyi Seem.*

Field-note for 16475 from Irosin, Luzon, June 1916:—Large burly tree on the upper rim of a very steep densely wooded gulch at 1750 feet altitude; trunk 4 feet thick at the base, 40 or more feet high, divided into few large ascending branches from near the base, subterete, the main branches crooked and ultimately numerously rebranched; wood sappy white on the outside, brownish toward the middle or center, hard and heavy, slightly bitter, odorless; twigs also crooked, ascending; bark brittle, brownish, densely excrescent, melleus except the epidermis; leaves horizontal, membranous or rather chartaceous, flat or curvingly folded, much paler beneath; inflorescent stalks erect, pale green; calyx darker green, buds and younger petals roseus, the latter turning ochraceus when old; stamens flesh red, stigma reddish brown; flowers odorless.

Vavaea ardisioides Elm.

Number 13974 *Elmer* is the type specimen and was published in Leafl Philip. Bot. VIII, page 2767.

Vavaea surigaoensis Elm.

Numbers 13636 and 13940 *Elmer* are the type specimens and were published in Leafl. Philip. Bot. VIII, page 2768.

WALSURA Roxb.

Walsura aherniana Perk.

Number 15628 was collected at Irosin, Luzon, December 1915, and was distributed under the above specific name.

Field-note not given.

Walsura monophylla Elm. n. sp.

A little tree or slender and shrub like; stem terete, 5 cm thick, 5 m high, branched from the middle; main branches ascending, the few ultimate branchlets lax and also slender; wood quite hard and heavy, white on the outside only, otherwise avellaneus, odorless and tasteless: bark brown, smoothish or peeling in small scales, very thin; twigs less than 5 mm thick, crooked, glabrous, spotted with grayish to brown lenticels; leaves alternatingly scattered toward the ends of the branchlets, single, ascending or usually horizontal; petioles terete, dark green, stiff and stout, strict, dirty brown when dry, glabrous, enlarged at both ends, 1 to 4 cm long on my specimen, the uppermost shorter, the lowest ones are longest, the nodes or enlargements are finely wrinkled on the lower side in the dry condition; blades nearly flat, chartaceous, dark green and sublucid above and glaucescent beneath in the fresh state, narrowly oblong, the smallest ones 3 by 8 cm, the largest ones on my specimen measure 21 cm long and 6.5 cm wide across the middle, apex bluntly acute to obtuse, more tapering toward the obscurely auriculate base, sometimes broadly obtuse to subcuneate, entire, curing unequally brown on their two sides, characteristically yellowish brown or isabellinus beneath, the upper surface dull brown, smooth and glabrous on both sides, rather rigidly chartaceous even in the dry state; midrib ridged beneath, dark brown on my specimens, also glabrous, not grooved along the upper face; nerves 10 to 15 on each side of the midrib according to the size of the blades, ascending, similar in color, conspicuous, tips ascendingly curved and reticulately anastamosing, quite evident from the upper side, a few short nerves toward the base; reticulations fine and obscure, barely visible from beneath; bud or young inflorescence suberect or ascending, terminal or subterminal, green; infructescence drooping or descending, pale green, dark brown when dry, the only one on my specimen 1 dm in length, paniculate or subthrysoid, branched from below the middle, all the branches relatively slender, the branchlets ascending, glabrate when old, more or less compressed or flattened on the dry specimen; pedicels ebracteate, 2 to 3 mm long, with an annular constriction at the distal end; calyx as long as their pedicels, tubularly constricted, set upon the pedicel constriction, at the top bearing the subpersistent remnant of the calyx segments in the form of a disk; the young fruits also pale green, short ellipsoid or subovoid, when dry yellowish brown or rusty and soft pubescent, much wrinkled on my specimen, from 5 to 8 mm in length, inserted upon the thickened calyx disk, containing a single whitish colored seed.

Type specimen number 12903, collected by *A. D. E. Elmer* in fertile black soil of a thinly wooded flat at 250 feet altitude,— Brooks Point, Palawan, March 1911.

Walsura palawanensis Elm. n. sp.

A small erect tree; stem 2 dm in diameter, about 10 m high, subterete, more or less crooked, rebranched toward the top only; wood moderately hard, reddish brown tinged except the thin white sapwood, odorless and nearly tasteless; bark thick, smooth and yellowish gray on the outside, otherwise latericius; branches spreading, repeatedly rebranched, forming a sort of a flat crown, the ultimate ones quite lax and with suberect tips; twigs round, roughened with old leaf scars, only the young green tips puberulent; leaves alternate, horizontally spreading or the younger ones ascending, varying from 1.5 to 2.5 dm in length, with 3 to 5 pairs of leaflets, either ending with 2 or 3 blades but usually 3-foliate; petiole 3 to 5 cm long, slender, straight, glabrate when old, swollen at the base, terete or flattened along the upper side; rachis even more slender, puberulent along the upper more or less flattened side, dull brown as the petiole in the dry state; petiolules similar in color, finely pubescent in the early stages, grooved along the upper side, 5 to 8 mm long or longer, not thickened at the base; leaflets ample, dull or dark chocolate brown on both sides when dry, descending, thinly coriaceous, nearly flat, in the fresh state paler green on the nether side, obliquely ovate to subelliptic or oblongish, the terminal blade sometimes short obovately oblong and upon slender petiolules two to three times as long as those for the lateral leaflets, the upper laminae usually larger than the lower ones, 5 cm by 11 cm, but most of them 3 cm by 7.5 cm, the basal leaflets often 2 cm wide by 4 cm long, apex gradually tapering to the acute to subobtuse point, base more or less oblique and inequilateral, obtuse to obtusely rounded or broadly rounded, the end blade symmetrical and equilateral, usually with a subcuneate base, the terminal young leaves with much smaller leaflets, entire, smooth and glabrate on both surfaces;

midrib ridged and hairy beneath, sunken and slightly hairy on the upper face, of a darker color when dry; nerves 5 to 8 on each side of the midrib, quite evident from both sides, ascending, very dark brown or reddish brown on the lower and finely ridged side, sunken along the upper face, glabrate, tips ascendingly curved and becoming obscure; cross bars or reticulations none; inflorescence suberect or erect, solitary or few clustered from the upper leaf axils, olivaceous pubescent at least in the dry state, greatly varying in length from 1 to 5 cm long, very short branched toward the top only, all the branches even the pedicels subtended by similarly colored pubescent bracts; the flowers crowded toward the ends of the ultimate branches, odorless, deciduous; calyx green, corolla yellowish, the nearly white stamineal tube soon turns to a deep purple; calyx 2.5 mm long, the basal one half pedicel like, 2 mm wide across the bluntly 5-toothed apex, glabrous; corolla campanulate or cup shaped, broadly tubular in the bud state, 3 mm long, glabrous on both sides; petals free, 5, becoming easily detached at the base, oblong, 3 mm long, 1 to 1.25 mm wide, with a midvein, apex obtuse or subacute and inwardly curved, broadly rounded at the base; stamineal tube 2 mm long, rather broader across the top, divided nearly to the base into 9 appendages, glabrous on the exterior, the appendages of slightly unequal alternating ones, thick, erect or nearly so. ligulate, the median inner portion thickened, sparsely ciliate below the anthers, at the apex laciniately 2-cleft; anthers on the ventral side of the appendages and sessilely inserted at the base and between the lacinae, glabrous, globose, 0.5 mm in diameter; ovary densely and bristly hairy, without a disk, flattened; style very short but relatively thick, glabrous; stigma large, puberulent, rugosely lobulate, twice as thick as the style, globose in outline.

Type specimen number 13158, collected by *A. D. E. Elmer* in fertile soil of dense humid forests at 500 feet altitude along the trail to Napsan,— Brooks Point, Palawan, May 1911.

Judging from *King's* description of his *Walsura multijuga* there seems to be a number of floral differences in our flowers, fruits not yet known in ours. Of all the Philippine material, our specimen is closely and nearest related to *Wenzel's* collection from Surigao. Also to be compared with *Clemen's* Lake Lanao specimens.

XYLOCARPUS Koenig.

Xylocarpus granatum Koenig.

This specimen was distributed under the above specific name.

Field-note for 12163 from Romblon, Romblon island, March 1910:—Shrub 10 feet high, in shrubberies bordering the seacoast; wood rather soft, white or with a small red central portion, odorless, with a faint pleasant taste; bark smooth or roughened with minute lenticels, gray to brown in color; branches spreading, the branchlets erect and more spreading; leaves chiefly at the ends of the twigs, spreading horizontally; leaflets coriaceous, the sides twisted and folded upon the upper side, smooth on both surfaces, deeper green above; inflorescence terminal or lateral, all the divergent stalks green; calyx yellowish green; petals and stamineal tube pale white, anthers yellowish brown, superior ovary and style whitish, the latter bearing the yellow stigma; the callous rim about the ovary is deep red. "Bacau" in Visayan.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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A FASCICLE OF SORSOGON FIGS

by

A. D. E. ELMER

ITINERARY *

In the fall of 1915 my botanical supplies were made ready for an exploration trip, not too far away from Manila—a natural desire I always felt when I left my family—yet where I could reach a portion of our alpine vegetation. In looking over the maps in the Coast and Geodetic Survey office the group of mountains situated in the most southern part of Luzon seemed quite accessible, and since they extended up to the alpine regions and had its flanks exposed to the influence of the Pacific ocean, this peculiar peninsula of Sorsogon province was selected for my field of operation.

From reports I had gathered, there was a good road from the Sibuyan seacoast town of Bulan to an interior town called Irosin. According to the maps, this town was

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* See also *J. P. Goldsberry* report on the "Eruption of Bulusan Volcano" in Philip. Journ. Sci., volume XI, page 251, 1916.

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situated on the southern side of the group of mountains, the highest point of which was estimated as between 5000 to 5500 feet, and its name was given as "Vol. or Volcan" Bulusan. These various dots on our Philippine charts printed as "volcan" never meant much to me before, for most of them were dead or inactive and heavily overgrown with vegetation. Since this Bulusan group of mountains has been dormant for long periods of time, and furthermore, since there were no signs of recent volcanic activity on it, there was no reason for me to fear that this peaceful volcano would wake up for action. Alas! Before I finish writing this itinerary I will narrate to you the action mount Bulusan took before I was through collecting its flora.

So, on a down pouring morning I, with our house servant *Silvestre Dumo*, an Ilocano youth, embarked on a small interisland commercial steamer. It took only two days of travelling in a general south east direction from Manila. On our way down we stopped at Donsol a seacoast town in the northwestern part of the province. On this trip we did not go to Sorsogon, the capital of Sorsogon province, which is located at the head end of the bay by the same name. Sorsogon bay is a large body of water, almost inland except for a narrow neck or strait at its entrance from Sibuyan sea. It is large enough in length to form a contriction toward Bacon on the north and Gubat on the east, both seacoast towns on the Pacific, and thereby shaping the Sorsogon peninsula of southern Luzon.

On the south side of the bay there were located the town of Casiguran and the barrio of Juban, on the north was the town of Castillo, all of which carried on a considerable trade. The first two places mentioned shipped large quantities of Abaca (the native trade name) or Manila hemp (the English trade name) to Manila. The town of Bulan was also a nice commercial town, located in a flat country on the west coast and on the sea of Sibuyan. The road built from Bulan to Irosin was the making of both of these towns. Even in my time there were auto trucks and some passenger machines running daily over these 15 miles, and every year this road was extended and made better. The people of the province soon realized the advantage of a well surfaced automobile road for transportation, over the old way of carrying their products on the backs of carabaos over mud trails. This road building policy for machines was continued until today a good road connects nearly all the larger towns with their capitol and best shipping ports. All kinds of goods moved from Manila through Bulan to Irosin. The main bulk of freight shipped from Irosin through Bulan to Manila was mount Bulusan grown hemp. The great yield of this fiber was the principle asset of the entire country, and it was a pleasure to look at the bluish green slopes of the volcano in the distance.

This Bulan to Irosin automobile road passed through or over low hills with small valleys between low ridges. The hillocks and little spurs of mountains were mainly covered with woods, fringed along the water courses with shrubs. In between, little fertile areas were being settled by Bicol farmers, many of whom settled along this main highway and formed scattered barrios. As the road was curving and winding itself higher and higher it finally reached the rim of a ridge about 1000 feet in elevation. From the summit of this ridge the road suddenly dropped into the Irosin valley at about 250 feet altitude. It was a beautiful sight on that clear afternoon to see this valley for the first time all spread out before me. Across this valley I could clearly see the green low foothills in front of the higher foothills and the darker green ridges extending upwards toward the summit of the Bulusan group of mountains. The top portion of the mountain rigde was of a distinct paler green, an indication of grasses and sedges.

I could see the town of Irosin to my right situated upon a little elevation at the upper end of the valley along the river.

With plenty of water for irrigation the people of Irosin made good use of their fertile valley and raised big rice crops, the staple food for the Filipinos. But the real plantation crop grown for cash sales to foreign countries the world over is the fiber plant, called abaca or Manila hemp. In this locality it was planted and grown in the foothills up to 3500 feet elevation and on all sides of the Bulusan group of mountains. The distribution of this plant with fibers strong enough for commercial use is known to thrive only in the Philippines, and even in our islands it is mainly grown along a narrow strip of land along the Pacific ocean from Tayabas province of Luzon southward to Davao district of Mindanao. It is propogated by young suckers, and the fibers are extracted from the leaf stalks which seem to form the stems. The hemp plant belongs to the same class of plants to which the hundred or more of different species and varieties of bananas belong.

The day we entered and drove through the main street of the town there was an afternoon public school parade in process. It made a patriotic impression on me, because nearly every house or home had a slender bamboo pole with an American flag standing in front next to the street lined up along both sides of the road. The flag poles were about 15 feet in length, their thin tips somewhat bent or curved to one side, and were set in the ground so that the curved portion bearing the small but uniformly sized flags hung well out over the street so the public could see and enjoy them. It was a plain and simple decoration, quite effective even to those who felt not so exhuberant over it as I did. From that time on I felt myself at home with the Irosin people.

The valley is not circular in shape but rather irregularly oval, narrow at the upper or Irosin end, flat at the broadened lower portion toward Juban and Casiguran in the north and where the river empties into Sorsogon bay. In my time there was only a trail or a sled road from the town of Irosin toward the bay in the north of us. Portion of this distance was very muddy in the rainy season. A similar trail or caratoon road extended from Irosin in a northeasterly direction to the town of Bulusan on the Pacific coast side. This trail or road leads over a broad forested incline which is gradual on the Irosin side and rocky in places, but rather abrupt on the side toward the town of Bulusan.

Irosin and its valley lies on the south and west of the Bulusan group of mountains. Apparently there is a continuous rocky ridge extending from the southeastern flank of the volcano around the southern side of the valley clear over toward the Juban district near Sorsogon bay. In the vicinity of Casiguran there are a few low hills with a short spur of a mountain which no doubt represent broken portions of the main volcanic flank on the south western side of it. This ridge or rim encircles three quarters of the valley, the only break is the broad and lower expanse along Sorsogon bay. Its rocky rim is very steep on the inner side, is far more gradual on the outer side of it. The automobile road crosses it at about 1000 feet altitude.

The only place where it seemed gradual over a 1500 feet altitudinal incline is half way between Irosin and the town of Bulusan on the Pacific side. The geology in this place apparently contains two rock formations—the old or real hard rocky rim and the newer or softer formation. Both formations extend from a spur of the volcano eastward toward the Pacific. The former formation is exposed on the abrupt side facing the Pacific. The latter formation is more or less evenly spread over the lower or harder materials. The Irosin rivulet has its source high up on the eastern side of the volcano, cuts down deep through this overspread formation. But when it comes to the solid old rocky material of the big Irosin crator rim, it seems to have cut its course at a near right angle down on the Irosin valley side and out into Sorsogon bay rather than straight down toward the town of Bulusan side into the Pacific. Can the Irosin valley itself represent the remnants of a huge crator of some geological past?

From the time we arrived at Irosin and were settled in an old house with pasture areas around it for my drying ground, we made good progress in the field while the weather was fine. *Silvestre* proved a good field helper and also did my cooking at the house. He could talk English well, having received his education in the American school of his home province. He soon became much interested in my work, in the evenings after our supper, I arranged and placed the fresh materials in dry papers, while he sat down by another kinki, a small German made petroleum table lamp, and changed my wet driers with dry ones. In the morning the old man, my landlord at the house, could put the wet driers out in the sun to dry while we were out collecting in the field. By this plan we made fair progress in our exploration work, with breaks when the weather was bad. Occasionally when we returned from the field we found the driers rain soaked and still out on the grass. On days of steady rain the old man had no chance to get them dry.

Silvestre became much interested in the plants of our region. He knew the native names of most of the common plants from his home or La Union province which were similar to those found in Sorsogon province. Sometimes, perhaps, they made him a little homesick. I then began to show him differences of our local plants, and he became convinced that there must be different species. So often we came to a plant in flower or fruit, he clearly remembered whether or not we had already collected it before and where. This showed that he was a close observer and made a study of the plants we collected, which, with his good memory was quite a help to me.

From the first week of our field operations I noticed the *Zingiberaceae* were well represented, and so I made a special effort to know them from the ground up. And since in this family we find flowers and fruits from the tip end of the stem, from the upper and lower sides of the stem, from the knob like thickenings of the radical or ground portion of the stem which was usually covered with a humus layer, and from the rhizomes in the ground near the base of the tussock or here and there along a slender horizontally running rhizome few feet to a few yards distance from the roots of the parent plant. A common practice in the field was to uncover the humus covering of the ground only for the possible flowers or fruits. The best or surest way however, was to pull the entire tussock out of the ground. Sometimes even a two man power could not pull them. *Silvestre* was intrigued, and so often he would fling his field press and knap sack down and began pulling on tussocks. I always stood ready to help him, and with the larger suspicious looking zinnies we both worked ourselves into perspiration. It was interesting work, and we both came to know the family pretty well at sight, and this fact, releived us from wanting to pull them all out of the ground in search for flowering and fruiting specimens.

He soon learned how to size specimens, and on certain days I sent him out in the field alone. As I inspected his collections at the house, he told me most interestingly the characters of the plants he had collected. One day he came home with knap sack bulging out, and he excitedly told me it was full of cotton found on the roots of a tree he had collected in fruit. Of course, I couldn't believe him, but I refrained from telling him so, for he had the cotton. Next day we went there and I found it was just as he told me. The specimens with the cotton sample he collected is number 15566, determined as *Zanthoxylum* (*Fagara*) *integrifolium Merr.* of the *Rutaceae* or lime family. Many specimens of this tree have been collected in central and in the northern Philippines, but only one or two collectors have casually mentioned this most peculiar product of the roots. This same species is also known from a small island near to and south of Formosa. The natives were using it for calking purposes. Japanese scientists were investigating the use and growth of this soft yellowish compact mass of silky fibers from a cork like bark of woody roots.

The town of Irosin was an ideal base for the collection of botanical materials. Starting in any direction, except toward the north or toward Juban and Casiguran on Sorsogon bay, we were obliged to contact some of the alpine ridges leading to mount Bulusan, or more often would encounter the subalpine portion of the old, old crator rim of the valley. This crator like ridge was rugged and unequal in altitude, varying from 500 to 1500 feet in height. This old formation was very interesting to me and many fine plants were found on its steep inner slopes and along its sharp edges. Also the broken hillocks beyond the rim toward Matnog and along the automobile road to Bulan on the western side afforded good collecting. But since there was a fairly good and travelled trail over the gradually elevated spur or ridge of the mountains at about 1500 feet altitude and towards the Pacific ocean, I more often walked out in that direction for my day's collection. Along this Irosin to the town of Bulusan trail or part road there were a number of barrios or settlements for the natives or Bicolanes who worked in the hemp plantations. I also noticed the virgin vegetation was richer and denser in this vicinity than else where. The altitude and the Pacific side may have something to do with it. No doubt it has, but as I indicated before, this whole sector of the eastern side of the volcano has an overflow of a finer and softer rock formation. This newer and fertile soil condition produces an abundance of excellent quality of fiber plants.

More and more my best exploration work was confined to this general region. About half way between Irosin to Bulusan on the Pacific coast, a secondary trail made a sharp turn to the left at Batag, and in a general line was heading straight toward the peak of the mountain. By and by this small settler's trail landed us upon a broad ridge at about 3000 feet altitude. Beyond this we had to cut our own way through. After surmounting a few rocky outcrops and keeping on the main ridge, blazing our trail through the steep subalpine woods, we finally came into scrub vegetation. By climbing some of these trees we could see a beautiful country with the town of Irosin located at our feet. Here we began to encounter coarse grass, and as we proceeded to higher elevation the scrub or woody vegetation became more scattering and the talahib grass so thick we could not see a yard ahead of us. We could not look over it either, for this alpine grass was ten or more feet high. All we could do was to cut ourselves through this dense mass. As we reached a little higher elevation we soon noticed this tall grass becoming shorter and thinner or gave way to other species of a smaller size. Pretty soon we could look over it, could see our ridge which was at our point considerably narrowed. But what thrilled us was the sight of the peak of mount Bulusan right near and standing straight out ahead of us! It was a clear day and the sun sparkled most gloriously!

As we surveyed our ridge in front of us we saw no obstruction except a short stretch which was smooth, narrow and rounded. On both sides of this neck were deep drops, the side on our right no doubt was perpendicular. Before we proceeded higher we tied a grass sheath or two upon one of the highest shrubs for a sign as to where our cut out trail begins. The summit region of Bulusan volcano on our side was all grass covered with scattered scrub vegetation along depressions and in other sheltered places. As we climbed higher, the grasses became smaller and around the exterior rim of the crator they were only shoe high. This reconnoitering for a possible route to the summit of this mountain and cutting ourselves through was not accomplished in a day, it took weeks of time. Not every day, but when we did go far up the mountain for collecting we tried to do as much as we could on the trail. We finally succeeded!

First, when we emerged out of the tall grass jungle the weather was clear, but as is known at these higher altitudes fog or clouds usually hang around these peaks and act freakish. Sometimes there is a strong wind or gale blowing. After waiting for half on hour or so the fog lifted and we started for the crator. We found it more or less circular in shape, broken or quite rugged, in places very steep or perpendicular on the inner crumbling side, gentler on the exterior, varying from 25 to 100 feet in height from the crest to the bottom of the crator. At the bottom of the cliffs on the interior, there were masses of rocks forming talus beds. As mentioned before the exterior slopes of the crator rim were fairly gentle. The rim on the side we came upon the crator was the lowest, but just a little to the north from where we were, stood a massive bluff from the bottom of the crator up to 300 feet and formed the crator end of a big heavily wooded ridge extending toward the town of Bulusan on the Pacific.

The Sorsogon and Casiguran sides of the crator were thinly covered with chaparral and mixed with some grasses clear up to the crest. Our side of the crator was primarily covered with grasses and sedges for a 1000 feet or less, or the distance between the scrub tree limit and the edge of the rim. The bottom of the crator was uneven or rolling and approximated an acre or so in area. There was no water in it, only a large 20 feet wide hole at the bottom of the big bluff. The rocky accumulations around the inner base of the rim had no vegetation, but the central mass of the finer stone materials or sandy soil had a few herbaceous plants—such as common grasses, weeds and worthless sedges. We walked all around in the crator and tried to look into every crook and cranny, but there were no shrubs found growing in the bowl.

Soon after our midday lunch, it was time for us to start on our homeward trip. Before we leave I must tell you a part of our day's pleasure. First of all we felt satisfied with having climbed to the summit of Bulusan volcano. This I could not always say of my other mountain climbing attempts in the Philippines. The day was fine, occasionally a fog or cloud would pass and give us a cooling. It seemed so safe and peaceful! Also, it was a great pleasure for us to view the beautiful sights from a 5500 feet elevation at our point. There was the perfect cone like Mayon volcano, situated a little to the northeast from us in the province of Albay. This majestic mountain is a mariner's land mark for long distances from both sides of southern Luzon. We could see Sorsogon bay as an almost inland body of water toward the north, but we could not see the capitol of the province. In plain view was Irosin with its flat valley and the hilly country beyond. Toward the east and northeast we saw a part of the broad expanse of the Pacific, the north coast line of Samar island. Between Luzon and Samar islands out in the Pacific ocean we could clearly see the little black islets in the San Bernardino straits, on one of which a terrible ship wreck occurred in recent years.

For some reason or another I began to have trouble with my eyes, gradually they became too sensitive to light and increasingly painful. The work of collecting was only a little more than half done, so, I decided to leave *Silvestre* with my botanical supplies at Irosin, while I packed my personal luggage and was ready for the first boat to Manila. A minor operation was performed, which necessitated my staying in the city for a few months. Every week I received a letter from *Silvestre* in which he indicated on the field labels the numbers he had collected. On January 22, 1916 or about that date we received a letter from him stating "The top of the mountain is exploded". I could not believe there had been an eruption and wrote that he should not be worried over the mountain and to confine his collecting to the lowlands. The following morning we read in the local paper in black headlines that Bulusan volcano of Sorsogon province was in eruption! Well, the boy has had his share of excitement, but he stayed at his post and continued field work on the opposite side of the valley from the volcano.

As soon as I could leave the city I was on my way back to Irosin, and was as glad to return as he was glad to see me again. And besides, this time I saw and heard an active volcano! We soon plunged into the full swing of the work. But when we approached the alpine flora along our blazed and cut out trail, it was a pitiful sight to see the vegetation. The more hardy plants ash covered, the more delicate plants burnt dead. Further up on our trail the trees looked sickly, little further up the foliage off, the finer limbs on the upper or mountain side ripped or broken off, still further up the mountain the larger limbs were similarly denuded. The bark of the stunted trees on the upside were smashed or peeled off. I have seen six inches thick stems of these hard and tough scrub trees torn or shot clear through. In some places part of the stony material of the shot was still lodged in the wood. Ashes were everywhere. Most of the stones from the eruption were a few inches to a foot in diameter, occasionally much larger or more often finer, even pulverized. The whole ridge clear to the summit was covered with this debris. Not a spear of the tall coarse grass or talahib was seen along our former route, so completely had the volcanic material covered our ground vegetation. As we glanced upwards toward the summit we saw a sulphur vent steaming on the left side of that narrow pass which we had crossed before on our first ascent. As a precaution against the effects of the fumes which wafted over and across this pass we decided on the use of our rope. *Silvestre* first ventured across with rope in hand at a time when the wind was blowing the main sulphur fumes the other way. While he was at the upper end with the rope, I was holding the lower end of it so that *Mr. S. B. Chestnut*, a supervising school teacher who made this trip with us, could make the climb along the rope. He faltered, lay down and began coughing. In a moment both I and *Silvestre* were by his side and helped him to walk up to the upper end where the fumes could not reach us. After resting and breathing clear air, he soon revived and we resumed our climb. We all had to cough for hours afterwards.

We could hear the rumbling or rushing sound of the crator which was filled with dense clouds or steam or both. We could not see far, and the place where we approached the rim it was so steep we had to scramble on our fours. The roaring sound of the crator just in front of us was very exciting to *Silvestre*, but menacing to me. He was ahead of me and I had to grab him from rushing toward the crumbling crest of the rim. So, while we sat down on the outside of the rim and waited for the fog to expend itself, I told him of the dangers lurking on these active points. After a while the fog raised and we were on the rim looking into the crator and noticed the large 20 foot hole of the sulphur vent forcefully steaming from the bottom up and along the side of the bluff. This transparent steam soon vaporized as it came in contact with the air. The roar was terrifying! From where we stood, we clearly saw the deep cut or chasm of the crator rim between us and the 300 feet high bluff rising from the crator bottom and which formed the upper end of the wooded ridge. The source of the Irosin river rises from the outside of this chasm.

As stated before, the average height of the crator rim was lowest on the Irosin side, and since this side is grass covered for the upper 1000 feet—not scrubby or woody clear up to or near to the crest of the crator rim—and especially now since the main eruption materials was thrown out over our side of the mountain, it would seem to indicate that the Irosin to Casiguran formation is the weakest sector of the Bulusan crator rim.

We did not walk down into the crator. Instead we wandered on the exterior side around on the Casiguran ridge where we saw scattered scrub plants and only a little debris on the ground. The plants were dying. I threw the axe from my shoulders to the rocky ground. It sounded hollow. Glancing around we saw ahead of us a little steam being emitted, and as our curiosity got the best of us we went a litle further or until we could see irregular cracks a few inches to a foot wide, and in them we saw a yellowish blue or a bluish green glow. We could also hear a faint subterranean noise. It was enough for us, we lithely stepped back and carefully retraced our footsteps back to our trail on the way home to Irosin. This was my second and last climb to the summit of Bulusan volcano.

As long as I continued my work collecting in the lower regions we could hear the roar of the volcano and see the vapor like clouds emitting from its crator. Sometimes we could hear it very plainly, but that was chiefly due to the atmosphere, the wind carrying the sound toward us, or away from us so we could scarcely hear it. Furthermore, the sulphur steam could scarcely be seen on dry hot days, but on cloudy or rainy days vaporized into a cloud like mass, giving the volcano the appearance of a steaming or smoking mountain. Sometimes our dead volcanos with crators or depressions at their summits seem active by reason of this fog or cloud display. A cloud moves up a ravine from the opposite side of the crator and settles into it. Later when the sky is cleared above, the cloud in the crator begins to move out and upward, making the mountain peak seem active. During the several months of my stay after the eruption, the force of the sound and volume of steam gradually deminished and nearly disappeared.

A few concluding remarks

One of the most remarkable plants discovered on this exploration trip was a rare and epiphytic shrub, a bright or cardinal red fruited *Fagraea* species. It was found in virgin forests on the eastern flank of the volcano facing the Pacific. See my number 15492.

Another interesting epiphytic shrub discovered in this wealth of vegetation was a rare, light golden yellow flowered *Rhododendron*. See number 16797.

In this same general region at 2000 feet elevation a number of interesting species of *Piper* were collected. The very distinct *Piper elmeri Merr.* was collected within a year or two on mount Maquiling, in Sorsogon province.

Samar and Leyte islands. *Piper varibracteum C.DC.* was originally discovered by me in the mount Apo region many years ago, and only now we find it here in the Irosin area for the second time. See number 16199. It climbs along tree trunks, bears two kinds of leaves—the specialized *Hoya* like insectivorous ones along the main stem, and the green leaves upon the branches from the top end of the stem. I failed to find *Piper myrmecophilum C, DC.* from Samar, with its dirty brown fimbriate insect pouches.

On the rugged rocky rim between Irosin and the town of Bulusan is a rambling *Artabotrys* in humid woods at 1500 feet altitude, with flowers and fruits on long stoloniferous roots or root like branches. See number 14610.

Among the old igneous rocks of this same ridge was discovered masses of *Mapania rostrata Elm.* n. sp. Twelve years later it was again collected on Alabat island. See number 16150.

Trees of *Canarium ovatum Engl.* or the pilinut were sparingly scattered in the lower foothills and among the hemp plantations. They are stocky trees, more abundantly grown on the Albay side of Luzon, through Samar down to Surigao of Mindanao. Their ripe fruits are purplish blue or nearly black, oblong and only obscurely angular in shape, on the tree appearing very similar to fresh prunes. The thick rind can be cut off from the bony triangular seed which contains the edible kernel. Dipping the ripe fruits into warm water enables the rind to slip off easily. See number 14472.

In rich damp ground of dense subalpine woods were collected a variety of *Melastomataceae.* Most conspicuous of which is a small tree with large leaves and beautifully colored flowers. See numbers 14690 and 16514 or *Beccarianthus ickisii setosus Merr.*

Finally my work was terminated, all my specimens dry, packed and ready for shipping home. First on trucks to Bulan, then on a crowded little steamer to Manila. My readers can imagine the size of the cargo that go to make four thousand numbers duplicated nearly thirty times. It bulked as one of my largest collections ever made in a circumscribed locality. I feel that the botany of Irosin vicinity including the southern half of Bulusan volcano is fairly well collected. In fact, I don't know of any other single locality in the Philippines so completely or so intensively collected, unless it is Los Banos including mount Maquiling. And now to Manila with all this material for study, preparing and writing articles for publication, ultimately to distribute this mass of herbarium specimens with labels, and to ship them to various botanical institutions the world over, was another task. It all was so interesting to me.

I feel assured that for the time spent in the field collecting, even at making some duplicates, is amply rewarded by the results obtained. Hereafter, Irosin will be on the botanical map, since many new species have been named after it, and many more of other interesting and critical plants have been collected within its geographical boundary.

PHILIPPINE FIGS IN GENERAL

Many years ago the genus *Ficus* was placed with other genera under *Urticaceae* or the nettle family. Since then other botanists have placed them under *Moraceae* or the mulberry family. In our local classification we follow the latter version.

Our fig species are pretty well distributed over all our islands, and in elevation extend from the seacoast to alpine regions, but none on the exposed high mountain peaks or ridges. The great mass of our figs inhabit middle elevations and are primarily associated with our virgin vegetation and along the great drainage system of our mountains. In a general way they all seek protection from storms, and many of them depend more upon moisture than upon good soil.

In this group of plants it is particularly essential to record as accurately as possible the character of the plant in the field, that is, whether it is a tree, a branched or unbranched shrub, an erect or subscandent shrub, a rambler, an epiphyte, a vine or a liana, a cleaver or a strangler — characters that cannot be preserved upon ordinary herbarium specimens and which are not of a technical nature. The reason why these characters should be noted in the field is because of the wide variations the genus as a whole has assumed, and special groups have adapted themselves along lines of growth and formed various habits such as few other woody plants of a single genus have done. And also, because it will assist the student to become better acquainted with our fig species in the field, and will thereby enable him to use our key for sectional characters.

Of the trees we have many species of varying sizes. In the lowlands there are quite a few which appear as introduced plants, see *Ficus hauili Blco.* In the foothills there are a great variety of trees, but the largest tree is an alpine species, see *Ficus apoensis Elm.* with a straight and round bole five feet in diameter and from 75 to 100 feet high. We have one species of figs inhabiting the lower foothills of Mindoro and Luzon which can be called either a small tree or a slender shrub. It is usually unbranched, bears the largest leaves of all our Philippine figs. It is such a curious or odd plant among other figs, so that it has been planted in some of our parks. One or two adjoining countries have asked for its introduction, see *Ficus pseudopalma Blco.* Besides this particular fig plant of the Pseudopalmae group, there are no doubt others of this section, plants of a smaller size and with fruits either in leaf axils or crowded in cauline heads. *Ficus multistipulares Merr.* from Samar, no doubt, belongs here. Many years ago I have seen in Leyte, but failed to collect it, a fig with an inch thick stem bearing fruits as above stated. These unbranched figs are rare and chiefly inhabit low humid areas along the Pacific coast from Polillo island southward to the gulf of Davao in Mindanao.

The greatest bulk of our Philippine figs and the greatest variety of them are found in the altitudinal belt between and including the higher foothills and the true alpine regions of our great mountains. They are scattered among the mixed shrubs and trees of other plants, along water courses, in valleys and upon ridges. In all of these favorable places we find most types of our figs—trees, erect or subscandent shrubs, epiphytes, cleavers, ramblers, vines, lianas and stranglers.

Along the creeks and rivers where these have cut through our mountains and worn deep gorges and canyons, we find a peculiar group of figs thrive which we call rock cleavers. They grow in mere crevices of perpendicular cliffs, spreading their cleaving root system out flat against the stone wall. Other cleaving species of figs spread their root system out and sprawl over huge bowlders of the river bed or over partially exposed bowlders and other rocky talus beds along the sides of the river. Or they exist here and there over large stones as scrub figs along dry creek beds in the valleys.

In our woods and forests we have a few scattering fig species which assume a sprawling or rambling habit, different from the cleaving or strangling habit. The rambler forms spreading branches over the ground and over stones or low shrubs, seldom climbs trees and never forms a system of cleaving or strangling roots. Its habits should be defined as between an erect shrub and a scandent shrub, see *Ficus mearnsii Merr.*

An epiphytic fig is one which grows from the humus covered axils of the large branches of our forest trees. It forms a tough tangle of branches, none of which are climbing, nor do they form a specialized system of cleaving or strangling roots. We have a limited number of this class of figs, mainly inhabiting the forests at medium elevations. Different species are quite variable in size, see *Ficus antoniana Elm.*

Of subscandent shrubs to powerful tree climbers there are a large assortment of figs. We have a few of the small or low subscandent kind, see *Ficus celebica Blm.* Then we have in the coconut plantations a rather finely branched fig vine which trails and climbs along the trunks of the palm trees, see *Ficus falcata Thnb.* This species is seldom found in fruit, and yet it is widely distributed. We also have a lot of the larger tree climbing figs, see *Ficus perfulva Elm.* And finally we have the powerful tall forest tree climbers called lianas, see *Ficus megacarpa Merr.*

When a ground rooted vine or shrub closely climbs along a tree stem, it is easy to understand. But when a thick rope like stem is rooted in the ground, swings clear and loosely upward to the limbs of a large tall tree where apparently its first branches form a mass of tough twigs and branches about the lower or larger limbs of its host tree, it is not so easily understood. Naturally the fig or liana began its growth in the ground where its roots remain, and by some means climbed along the tree trunk until it reached the limbs around which it seems to have anchored itself with its branches. Usually those host trees have rough bark, and many of them have other climbing vines, either woody or herbaceous, closely or loosely climbing along its trunk. In the humus covered axils of the tree branches are all sorts of plants—mosses, ferns, orchids, climbing *Araceae* and *Pandanaceae* and other shrubs of various families. But what I cannot understand is the presence of snakes found here and there in this mass of humus and tangle of vegetation so high up in the trees! Sometimes the old stem of these tall tree climbers or fig lianas are very long and their stems appear as guy ropes trying to hold the host tree verticle. I imagine it takes many years to accomplish the climb with as many visissitudes. None of these various climbers of subscandent shrubs to typical lianas are injureous to their support or host trees.

There are many other families besides the fig family which produces vines and lianas. In fact, the untrimmed virgin vegetation of our islands is veiled with them. Try to walk through the foothill or parang vegetation or even among our forests of higher elevation without a bolo or hatchet in your hand! Most of these species are small, with herbaceous or suffrutescent stems, and are more strictly called vines. They are numerous in kind and various in shape and in sizes. In favorable places the traveller can see half woody twining plants of the larger size twine around each other in a perfect rope like fashion from a few feet to fifteen feet long without a break in their braid. These stems are usually round or terete, porous in wood structure and are very or quite flexible. In fact, most of them are tough, and therefore may be used by the native woodsman for tieing purposes.

The stems of some of our largest lianas belonging to other families are quite irregular in shape. They are round, wadded, compressed into two subequal longitudinal halves or are flattened out into a ribbon like form two to three inches thick and a foot or more in width. The largest of the ribbon shaped lianas is *Bauhinia mirabilis Merr.*, discovered by me in British North Borneo. The largest of the rounded or terete type of lianas, also from Borneo, is a species of *Whitfordiodendron Elm.*, whose old trunk at or near the ground is as thick as a man's body. Incidentally both of these groups belong to *Leguminosae*, the pea and bean family. But the greatest climbers in our Philippine forests which I have come to admire are the rattans or climbing palms with a smooth, curved and looping stem only one to two inches thick throughout and 600 or more feet long, with only a tassel of frond like leaves at the top end extending straight out above the highest forest trees similar to that of a flag mast!

Now we come to the least understood type of Philippine figs for study, the Strangulares. The cleavers we have already discussed, yet in a way we must mention them again, because they have similar habits of growth and in general the characters of the leaves and fruits are the same. The Filipinos call both classes baletes. The origin of this name is not known, but it seems to have a base or sinister meaning. In our classification we consider them under one section. The cleavers are abundant along water courses, grow upon cliffs, huge bowlders and other stone masses. They thrive upon little more than water soaked sand and gravel. The stranglers, on the other hand, start growing upon forest trees of very rich humus covered ground on easy inclines at medium elevations. It is not known whether the seed of the cleaver would grow into a mature strangler, or the seed of the strangler would grow into a mature cleaver. My own limited observation of the life cycle of a strangler is somewhat as follows:—

The seeds of the strangling figs are disseminated primarily by birds. The axils of forest tree branches contain humus and various sorts of vegetation, and with the moisture of frequent rains form inviting spots for germination and growth. Even the leaf axils of palm trees are suitable places for them to grow. The leaf bearing part grows upwards, becomes more and more widely branched or spreading. The root portion grows downwards in a crawling and cleaving fashion. It branches and crosses itself, forming an interlaced mass around the tree trunk. This enmessed system gradually grows thicker while its tip roots continues growing further down toward the ground. As soon as they contact the soil they powerfully anchor themselves to it, become enlarged and even develope into buttresses. The whole mass now assumes a latticed appearing trunk. The parts of this entire system cleave so tightly to the bark of its host as to become flattened and almost inseparable from it.

Seemingly the strangler has no sucking organs for the purpose of robbing the food of its host plant. However, there are short rootlets extending from the sides of the interlaced masses to the bark surface of the host. These rootlets are not always in plain sight, no doubt they absorb moisture and nourishment for the growing strangler. Thus far, the main function of the enmessed root system is to form a self supporting trunk. Now, the anchored roots to the soil can absorb inorganic mineral substances which the latticed stem of the strangler conveys to its green leaves. By this time the roots fastened in the ground and supplying extra food matter, the strangler has grown strong in its strangling capacity. In this process there is a powerful force applied by the matrix of the roots upon its host. The effects of the tight squeeze can often be seen as distinct depressions upon the bark and sapwood of the host trees. But just how is strangulation performed? I don't know, unless the encircling roots cleave so effectively upon the host tree as to obstruct the flow of organic and inorganic matter for the host.

Anent to this subject on strangulation, the question is sometimes raised, does the strangler kill the host? There is no question of the host tree being in existence before the strangler can begin its life, and the strangler remains after the host is dead and gone. And if the increasing girth of the host trunk causes the strangling roots to become compressed and is the cause of the depressions upon its own surface, then how about those figs cleaving to the rocks and bowlders?

Besides the root matrix encircling the stem of the host tree and the rootlets on the enmessed portions, there is usually another system of roots, called air roots. They are the bunches of fine roots hanging from the leaf bearing branches or even from the enmessed cauline root system. These thin and pliable roots grow straight down toward the ground. Upon reaching the soil the strongest of them develope a mass of ground roots and the aerial portion thickens and grows into a system of proproots or pillars. I have no doubt these stems convey the inorganic matter the roots absorb from the soil to the leaf bearing branches and into the leaves themselves. This additional food supply and the added strength of the pillars enables the ever widening and spreading branches of these stranglers to live to a ripe old age.

In the forests we can see young stranglers which are little more than epiphytes. Middle aged ones I assume to be those with their crawling root system encircled around its host and well anchored in the ground. The still older ones has its host in its powerful grip for supremacy. In this state, the host is weakening and usually begins to sag or decline. The apparent reason for the inclining stand or posture is that the strangling trunk is not sufficiently strong to support the additional weight of the host. The heavier the host, the stronger the buttresses grow. Besides, a series of extra proproots or pillars are developed on or along the lower side of the trunk to assist in upholding it. That is the explanation why we find the ground portion of most of our old stranglers so very irregular. Occasionally a portion of the host tree breaks off and dies, while the fig readjusts itself and continues to live.

When we see those curious old strangling and widely spreading monarchs in the otherwise beautiful forest setting, it not only saddens but it is awe inspiring and almost fills us with fear! The very old or oldest stranglers, without a vestige of its host remaining, are queer objects, pitiful objects, crooked or irregular and appearing broken, inclining and considerably shorter or only half as high as the adjoining mature forest trees. They seem to represent the crippled remnants of a terrible combat in life! Filipinos have only bad things to say of the balete or strangler in their folk-lore.

How long it takes a strangling fig to live its life cycle is hard to predict. My opinion is it takes a much longer time than all the annular rings of a solid tree trunk would indicate. I suppose it depends somewhat upon the age of the host tree. If its life is in its waning years, the strangler may not have so good a chance to acquire sufficient strength to stand alone when the tree breaks or falls by itself. Or how much longer a strangling fig can live by itself after the host is dead and gone or decayed is another problem of conjecture.

Since none of our fig species have wood of any use whatsoever, these stranglers which live in ideal forest producing areas should be exterminated in order to make more room for useful trees to grow. Here is another thought on this subject. Could a tree be saved from the strangler if its root systems were cut off without injuring the host, and would the fig continue to live? I am inclined to believe the strangler would strive to live by reproducing the cut off roots with new ones, contact the ground and live its natural life. Possibly the vigorous fig species would heal a second severance, or even a third. Cleaving and strangling figs have a great recuperating vitality. The very nature of their precarious lives makes this quality necessary.

The foliage of our Philippine figs are all of the evergreen class except one or two species which do shed their leaves and take a rest period before the new ones develope. The leaves are various, large as already stated in the palm like *Ficus pseudopalma Blco.*, and small as in *Ficus disticha Blm.* Their edges are smooth, except in a very few cases where they are toothed, incised or even lobed. In shape they range from the orbicular to the narrowly linear type. The leaf texture of most of our fig plants is of the thick or leathery kind, or very thick and rigid such as is usually met on the baletes, the cleavers and stranglers. These latter are usually very smooth and shining. A small group of our figs have their nether sides areolate. But in many other species of figs in our islands they are soft in texture and hairy or pubescent in vestiture. Some have a harsh or scabrous character, so much so that they are being utilized by the poorest classes of natives for scouring purposes, see *Ficus ulmifolia Lam.*

The seasonable crop of our Philippine figs is irregular as far as individual species is concerned. The majority of them produce a very great abundance of fruits annually. Here we must record one exception, that of *Ficus falcata Thnb.* which is the rarest fruit producer in our islands. The fruits are either single or in pairs, from the leaf axils or in the axils of fallen leaves, or are clustered upon woody branches from stem and main branches of the tree or occasionally from its roots. Most of our tree species bear fruits upon these branches, see *Ficus minahassae Miq.*, which is our most remarkable and characteristic fig of the Tuberculatae group, and for that matter also from all the rest of our Philippine figs. These specialized fruit bearing branches or tubercles are either short and rigid or long and flexible, in extreme cases only an inch long or twenty feet in length. The tubercles are usually branched, and most of the season are loaded with fruits which in some instances completely conceal the stem of the fig tree, see *Ficus heteropoda Miq.* The shape of the fig fruits are usually globose, obovoid or elliptic. Many of them bear excrescences around the top, others have obscure ridges from apex toward the base. Our smallest are the size of small peas or cranberries, see *Ficus microsphaeria Warb.*, and our largest fruits measures four inches across in the fresh mature state, see *Ficus cassidyana Elm.* In exposed places they vary in color from deep red to light yellow or orange, sometimes appearing as prasineus to atropurpureus. In the half hidden or dark shady places they are inclined to retain their green to dark green color, their lower or basal sides turning a pale white or yellowish white color just before turning soft. In vestiture they are smooth, hairy, rough or scabrous, seldom pustulate or sulcate. None of our fig fruits are edible or more truthfully stated palatable. Most of them when mature turn soft just before falling.

The bud bracts for the leaves are various, in a few cases extremely characteristic. But how much do we know of the fruit or infructescent bracts? They are present in most species, especially in the Tuberculatae sections, thin and membranous, different in size and shape, when young yellowish green, soon withering and turning brown, fugacious. Usually when the fruit is in condition for collecting, most of these subtending bracts have already fallen. So, there is a good reason why our herbarium specimens are mainly without them. They may or may not have any specific value. Even before they fall, they form a damp or wet and half decayed covering over the young fruits or entire infructescence. Those fruiting masses near the ground are often dirt mixed or dirt covered and inhabited by small but troublesome ants. They, the bracts, are nasty things to collect and preserve.

Frequently the question is naturally asked, but where are the flowers? Well, a fig fruit can always be known by the small aperture at the top of a fleshy receptacle or rind, and if you pinch the rind open, the fruit appears hollow, but on the inside surface of the rind or receptacle there are numerous minute flowers of various sorts—the male, female, neutral, hermaphrodite and so on. It takes patience with a dissecting microscope to find them. These flowers are pollinated or fertilized by small insects crawling through the apical orifice for egg laying, and so when all the work of pollination in the wild ones or caprification in the cultivated forms is completed, the receptable or syconium of the fig flowers developes into a soft fleshy portion, the fruit of the fig plant. I have seen the cavity of certain wild figs filled with minute but mature *Hymenopterous* insects. And in other instances I have found the interior filled with small creamy white and jumping larvae. The seeds are small, smooth and bony, more or less rounded achenes, appearing or tasting granular, attached to or upon the inside of the fleshy fruit.

From an economic view point, our figs are of little use. In fact the stand of more useful shrubs and trees in our islands would be increased if the wild figs were nonexisting. The wood of all fig tree species is too soft for strength and durability, on ramblers and epiphytes it is tough, in lianas it is even porous. The wood of one or two of the most porous lianas, see *Ficus cataupi Elm.*, is used by the interior natives of Mindanao as the base for chewing material in connection with betlenuts, lime, *Piper* leaves or half scorched green tobaccos, and to increase the already spiced concoction they sometimes add a pinch of chillies. Most of our figs yield latex more or less at irregular seasons. A few of our rambling and subscandent vines have no latex in their bark. Even the best producers of this product is of no commercial value as a rubber substitute.

In Manila there are several introduced species of figs, not for their fruits but rather for their curious and ornamental features. We have *Ficus elastica Roxb.* with its large rigid leaves and long pink bud bracts. Most of these older trees have bunches or masses of air roots hanging from the larger or lower limbs and from the rough irregular stem, some of them taking anchorage in the ground and forming the socalled proproot system, similar to that of the banyan tree in northern India. Then we have *Ficus religiosa Linn.* with poplar like leaves and stems appearing wadded and twisted in a rope like fashion. Here and there are seen bunches of air roots hanging from yellowish brown stem and branches. In India it is chiefly planted with a religious object, being regarded as sacred by both the Brahmans and Buddhists. A more recent introduction is the *Ficus henneana Miq.* with its numerous small leaves and their fine branches pendant or drooping, similarly to certain willows. Its stem is straight, short and irregularly round, but here and there already appear the small bunches of air roots hanging from stem and branches. It is very thrifty, produces an abundance of small fruits from their leaf axils and makes beautiful avenue borders.

As already noted, cleaving and strangling figs posses a very tough or recuperative life. In fact, all of our figs are a healthy group of plants and are capable of holding their own. So even, the entire group of our Philippine figs at least have kept their technical characters together, the genus as a whole has not lent itself to breaking it into several to more numerous and almost unusable brand new genera. It is quite evident that the above named introduced species belong to and are included under the Strangulares section of our classification. And so when these plants are planted under very different conditions than their natural environments, they adjust themselves to great extremes. No doubt in their native environs they would be true to their life habits, but here they grow into stocky trees. Remember, they are living in bondage and are making the best of it!

From a geographical stand point the whole group of figs is pantropic in distribution, extending pretty well northward and southward of this belt. Approximately 2250 fig species in the world have been described and published by various authors in numerous publications. Of this number a large portion of them are, no doubt, duplicates. Most of them come from tropical Asia and north and south of its zone. Many come from tropical and subtropical South America and Africa. In the Philippine Archipelago we can count on 200, including the duplicates or synonyms, while in this my own collection from Sorsogon province there are 59 species enumerated, 15 of which are herein published as new.

LIST OF FIGS REPORTED FROM OUR ISLANDS

Section 1. - **Pseudopalmae.**

Ficus blancoi Elm.
" haenkei Warb.
" multistipularis Merr.
Ficus palmifolia Ust.
" pseudopalma Blco.

Section 2. - **Areolatae.**

Ficus antoniana Elm.
" apiocarpa Miq.
" areolata Elm.
" bordenii Merr.
" cataupi Elm.
" disticha Blm.
" elliptica Miq.
" falcata Thnb.
" finicis Merr.
Ficus lanaensis Merr.
" laxiramea Elm.
" megacarpa Merr.
" peninsula Merr.
" punctata Thnb.
" rivularis Merr.
" tayabensis Elm.
" warburgii Elm.

Section 3. - **Tuberculatae.**

(T. - longifructescens)

Ficus barnesii Merr.
" casiguranensis Q. & M.
" cervina Elm.
" conora King
" cuernosensis Elm.
" cuneata Miq.
" endothrix Warb.
" kalingaensis Merr.
" linearifolia Elm.
" maquilingensis Elm.
" merrillii Elm.
Ficus merrittii Merr.
" minahassae Miq.
" mindorensis Merr.
" mirabilis Merr.
" olivaceus Elm.
" ribes Blm.
" sordidissima Elm.
" sorsogonensis Elm.
" subalbido-ramea Elm.
" trichantha Warb.

Section 3. - **Tuberculatae.**

(T. - curtifructescens)

Ficus anomala Merr.
" appendiculata Merr.
" arenata Elm.
" binuangensis Merr.
" cassidyana Elm.
Ficus castanea Elm.
" compressitora Elm.
" decussata Warb.
" garciae Elm.
" gerontocarpa Warb.

Ficus glomerata Roxb.
” grandidens Merr.
” heteropoda Miq.
” ilangoides Elm.
” integrifolia Elm.
” laevigata Vahl
” latsoni Elm.
” nota (Blco.)
” odorata (Blco.)

Ficus paucinervia Merr.
” peabodyi Elm.
” repandifolia Elm.
” rubrovenia Merr.
” satterthwaitei Elm.
” sargentii Merr.
” scabra Forst.
” variegata Blm.

Section 4. - **Strangulares.**

(S. - pedunculatae)

Ficus balete Merr.
” caulobotrya Miq.
” caulocarpa Miq.
” chrysolepis Miq.
” hallieri Merr.
” johnsoni Elm.

Ficus longipedunculata (Merr.)
” magallanensis Elm.
” prasinicarpa Elm.
” pruniformis Blm.
” stipulosa Miq.

Section 4. - **Strangulares.**

(S. - sessiliflorae)

Ficus altissima Blm.
” auranticarpa Elm.
” balabacensis Quis.
” benjamina Linn.
” calophylloides Elm.
” camarinensis Merr.
” clementis Merr.
” clusioides Miq.
” comosa Roxb.
” crassicalyx Elm.
” elastica Roxb.
” elliptifolia Merr.
” everettii Elm.
” forstenii Miq.
” gelderi Miq.
” haematocarpa Blm.
” henneana Miq.
” indica Linn.
” indica gelderi (Miq.)

Ficus iwahigensis Elm.
” lamaoensis Merr.
” microcarpa Linn.
” nitida Thnb.
” nuda Miq.
” pachyphylla Merr.
” pacifica Elm.
” palawanensis Merr.
” papaya Blco.
” pilosa Reinw.
” religiosa Linn.
” retusa Linn.
” sericea Rob.
” silvestrei Elm.
” strangularis Elm.
” umbo-bracteata Elm.
” umbrina Elm.
” vidaliana Warb.
” xavieri Merr.

Section 5. - Axillares.

(A. - glabratae)

Ficus adamii Elm.
” altimeralos Roxb.
” ampelos Burm.
” angustissima Merr.
” apoensis Elm.
” arayatensis Warb.
” argentea Blco.
” bakeri Elm.
” banahoensis Elm.
” bataanensis Merr.
” benguetensis Merr.
” benguetensis leytensis Elm.
” benguetensis negrosensis Elm.
” brunnea Merr.
” callosa Willd.
” camiguinensis Merr.
” carica Linn.
” cardinalicarpa Elm.
” caudatifolia Warb.
” collinsii Elm.
” concinna Miq.
” confertifolia Merr.
” confusa Elm.
” copelandii Rob.
” copiosa Miq.
” cordatifolia Elm.
” crassitora Elm.
” curranii Merr.
” decaisneana Miq.
” didymophylla Warb.
” driveri Elm.
” edanoii Merr.
” eucaudata Elm.
” fiskei laevifolia Merr.
” gigantifolia Merr.
” glabella concinna King
” guyeri Elm.
hauili Blco.

Ficus inaequifolia Elm.
” infectoria Roxb.
” insularis Miq.
” irosinensis Elm.
” laccifera Blco.
” laevicarpa Elm.
” lagunensis Merr.
” leucantatoma Poir.
” leucopleura Blm.
” linearis Merr.
” lucbanensis Elm.
” luzonensis Merr.
” luzonensis imberbis Elm.
” magnifica Elm.
” malunuensis Warb.
” manilensis Warb.
” mearnsii Merr.
” microsphaeria Warb.
” mindanaensis Warb.
” multistipulosa Merr.
” nervosa Hey.
” parietalis Blm.
” parvifolia Miq.
” pedunculosa Miq.
” philippinensis Miq.
” pubinervis Blm.
” puncticulata Merr.
” radiata Decn.
” radicans Roxb.
” ramosii Merr.
” rapiformis Roxb.
” rostrata Roxb.
” rubrocarpa Elm.
” rudis arborea Elm.
” saxophila Blm.
” setibracteata Elm.
” sibuyanensis Elm.
” similis Merr.

Ficus subulata Blm.
” tinctoria Forst.
” urdanetensis Elm.
” urophylla Wall.
” validicaudata Merr.
Ficus viridifolia Merr.
” weberi Merr.
” wenzelii Merr.
” williamsii Rob.
” worcesteri Merr.

Section 5. - **Axillares.**

(A. - nonglabratae)

Ficus acuminatissima Miq.
” asperrima Roxb.
” ahernii Merr.
” blepharostoma Warb.
” bulusanensis Elm.
” carpenteriana Elm.
” celebica Blm.
” celtoides Elm.
” chrysocarpa (Reinw.)
” crininervia Miq.
” cumingii Miq.
” difformis Lam.
” elmeri Merr.
” euphlebia Merr.
” fastigiata Elm.
” fenicis Merr.
” fiskei Elm.
” fiskei cebuensis Merr.
” flavo-cortica Elm.
” fulva Elm.
” glareosa Elm.
” haggeri Merr.
” hemicardia Merr.
” heterophylla Linn.
” hispida Forst.
” hispidulosa Elm.
” irisana Elm.
” jaroensis Merr.
Ficus lancifolia Miq.
” luzonensis Merr.
” macropoda Miq.
” multiramea Elm.
” obscura Blm.
” obtusa Hassk.
” paloensis (Elm.)
” perfulva (Elm.)
” pisifera Wall.
” producta Merr.
” propinqua Merr.
” quercifolia Roxb.
” quercifolia humilis Elm.
” recurva Blm.
” rudis Miq.
” ruficaulis Merr.
” ruficaulis paloensis Elm.
” samarensis Merr.
” sibulanensis Elm.
” sibuyanensis Elm.
” sinuosa Miq.
” sparsifolia Merr.
” subintegra (Merr.)
” sulcata Elm.
” terminalifolia Elm.
” todayensis Elm.
” ulmifolia Lam.
” villosa Blm.

SORSOGON FIGS IN SECTIONS

1 — Palm-like erect shrubs, occasionally few and short branched. **1. - Pseudopalmae.**

1 — Branched trees, shrubs or vines and epiphytes.

2 — Tall climbers or lianas, also epiphytes but no cleavers nor stranglers; leaves usually areolate beneath; fruits axillary or sometimes along the twigs, seldom upon tubercles from stem and larger branches. **2. - Areolatae.**

2 — Always trees; leaves not areolate beneath; fruits always upon tubercles from stem and larger branches, very seldom along the twigs or even in the leaf axils. **3. - Tuberculatae.**

3 — Tubercles flexible, longer than 3 dm. **T. - longifructescens.**

3 — Tubercles rigid, shorter than 2 dm. **T. - curtifructescens.**

2 — Originally epiphytic, its enmessed portion developing into a strangler; also the cleavers upon cliffs and over bowlders; leaves not areolate beneath; fruits axillary or sometimes along the twigs. **4. - Strangulares.**

3 — Fruits pedunculata. **S. - pedunculatae.**

3 — Fruits sessile. **S. - sessiliflorae.**

2 — Trees, erect or scandent shrubs, epiphytes but no stranglers nor cleavers; leaves not areolate beneath; fruits axillary or sometimes along the twigs, never upon tubercles. **5. - Axillares.**

3 — Foliage glabrous and smooth. **A. - glabratae.**

3 — Foliage pubescent or scabrous. **A. - nonglabratae.**

Section 1. - **Pseudopalmae.**

Ficus haenkei Warb.

Notes for 16573:—Number 983 *Merrill* from Calapan, Mindoro is the same as the central and northern Luzon forms, and is considered typical *Ficus pseudopalma Blco.* Number 7342 *Elmer* from Palo, Leyte is the type of *Ficus blancoi Elm.* The leaves of these two specimens cannot be classed as one and the same species, neither do I think either of them to be *Ficus haenkei Warb.* From my own field observations there seem to exist more than one or two distinct forms of the Pseudopalmae group, ranging along the Pacific coast from Polillo island to southern Mindanao. In my opinion *Ficus multistipularis Merr.* also belongs in this same group, but how it differs from *Ficus haenkei Warb.* and *Ficus palmifolia Ust.* is not clear to me.

Section 2. - **Areolatae.**

Ficus megacarpa Merr.

Notes for 15393 and 15613:—A liana, climbing forest trees at medium altitudes; stem as thick as a man's wrist, subterete, rooted in the ground and sometimes extended in a rope like fashion for 30 feet or more before branching; branches rigid, reddish brown, crooked, numerously rebranched, the older or longer ones subcompressed, the younger ones forming rootlets which tightly attach themselves to its support; leaves quite variable in the younger stages, smaller, thinner, occasionally oblique or falcate, sometimes broadly cordate at the base and usually different in shape from the mature ones which are quite similar on all our specimens; fruits are sometimes found in the axils of the leaf scars but usually they are clustered upon really short and very rigid tubercles, here and there along the stem or larger branches, globose or obovoidly so, seldom ellipsoid, hard, russet brown, with pink to creamy white spots, turning dark purple when old.

Mostly collected in Luzon, and whether there is only one form or two or three distinct species in our islands is hard to decide.

Ficus peninsula Elm. n. sp.

A scandent shrub or liana; old stem with white porous wood, 5 to 8 cm thick, with a flow of latex, occasionally with primary branches which are numerously rebranched and forming tangled masses; branchlets terete, wrinkled when dry, very tough, gray and smooth except for the leaf scars; twigs rather short, ascending and leaf bearing, glabrate, more or less angular in the dry state, often curved and twisted. Leaves rigidly coriaceous, mostly ascending, upon ascendingly curved petioles, mostly conduplicate and with recurved tips, lucid and darker green on the upper surface, much paler beneath, curing unequally brown on the two sides, glabrous and areolate on the cupreus lower face, margins subinvolute but entire, ovately oblong to subelliptic, base broadly obtuse to truncately rounded, rather abruptly terminating into a sharply acuminate point which is often a trifle falcate, the largest blades on my specimens 18 cm long by one half as wide below the middle, the smaller ones 3 by 6 cm and more elliptic in shape; petioles very stout, scaly brown but with age glabrous, curved, in length from 2 to 6 cm, leaving conspicuous circular scars after falling; midrib ridged beneath, caniculate above; nerves 5 to 7 on either side, the basal pair ascending, conspicuous beneath, the upper ones divaricate, tips upwardly curved and reticulately united; reticulations barely visible or rather evident from the lower side; bud bracts fugacious, 1 cm long, overlapping, glabrate, rigid and reddish brown, glabrate, sharply pointed. Fruits hard and green, pendant from the upper or terminal leaf axils, ellipsoid, not pyriform or subglobose, solitary or in pairs, few, spindle shaped and puberulent when young, ultimately glabrate; peduncles 1.5 cm long more or less, short brown pubescent or puberulent when young, finally glabrate, with 2 or usually with 3 short blunt bracts upon the stalk below the middle and toward the base; syconium 4 cm long by 2.5 cm thick in the dry mature fruits, thick, full of gummy latex, the cavity filled with pale white flowers; umbilicus terete, slightly raised, well closed over by imbricate short coriaceous bracts; the middle bracts horizontal, submembranous, 2 mm broad by 3 mm long, ovately elliptic, glabrous, much thickened at the base, midvein dark brown, sides more or less spotted, the inner ones oblong and usually shorter; syconium thick; the flowers male and gall, the former relatively few and scattered among the latter; staminate monandrous, up to 8 mm long; the basal one half stipe like, crooked, dark reddish brown, angular or compressed, the segmented portion in the young state illipsoidally elongated, entire and overarching the anther, finally divided into 5 more or less lanceolate very unequal sharply pointed lobes; filaments average 1.5 mm long, very thick and blackish brown, the connective very similar; anthers about as long, oblong, flattened, emarginate at the truncate base, obtuse at the apex; insect flowers short or long pedicelled, the pedicel similar to that described of the male flowers; perianth 3 to 5 - laciniate or even more numerously lacerated from the base; the reddish brown lobes very linear, more or less broadened at or toward the base, 5 to 7 mm long; ovary subglobose or obovoid, 1.5 mm long, smooth, dull reddish brown; style subterminal, 1 mm long, erect and rigid.

Type specimen number 16116, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, May 1916.

Collected this liana in woods upon a forest tree trunk at 2500 feet up the mountain. Many years ago I collected this same species under number 7445 on mount Banahao and which was distributed as *Ficus apiocarpa Miq.* But there seems to be a number of differences in our plant from *Miquel's* description.

Ficus tayabensis Elm.

Notes for 14919 and 16420:—A climbing liana on a wooded ridge of well drained good soil at 1250 feet; stems terete, 2 to 3 inches thick, bendable, fastened at or in the ground and extending in a rope like fashion along a tree trunk up to 30 feet or to the first limbs where it is branched and forming dense masses; wood porous, reddish toward the center, covered by a dull brown lenticelled bark which when cut freely bleeds with latex; twigs tough, smooth, gray; leaves subchartaceous, subareolate, horizontal, flat except the recurved apical portion, much paler green beneath, upon ascending and brown colored petioles; midrib and nerves whitish green; fruits axillary, globose, hard, dark green except the minute light brown lenticels.

Number 16420 is a large leafed form. Our species forms a closely grouped alliance with *Ficus warburgii Elm.*, *Ficus samarensis Merr.*, *Ficus rubrocarpa Elm.*, *Ficus ramosii Merr.* and *Ficus bakeri Elm.*

Ficus warburgii Elm.

Notes for 15850:—A lofty tree climber in moist forests at 1750 feet; stem 5 inches thick, crooked and twisted, usually twining about its host or support; wood porous, whitish; bark rather thick, gray, roughened with brown excrescences, with latex; branches at the top numerous and forming tangled masses; twigs relatively short and brownish; leaves ascending, rigid, flat or shallowly folded, sublucid above, paler and subareolate beneath:

peduncles green as are the subobovoid or obovoidly globose receptacles which are one half of an inch in diameter; umbilicus very small and smooth; florets deep red.

Very sparingly collected and only known from Laguna, Tayabas and Sorsogon provinces of Luzon.

Section 3. - **Tuberculatae.**

(T. - longifructescens)

Ficus linearifolia Elm.

Notes for 14514 and 14949:—Small trees in dense forests of steep inclines at 1500 at 2500 feet; stem crooked, terete, 5 inches thick, 20 feet high, branched from the middle; wood soft, white to brownish toward the center, odorless and quite tasteless; bark mottled, smooth; leaves ascending to descending, submembranous to subcoriaceous, very dull green but much paler green beneath; branches ultimately numerous; fruits from slender flexible tubercles 1 to 2 feet long, hanging from the stems; the receptacles greenish, turning whitish with age at the base, compressed globose and with brown lenticels, less than one half inch across, ridged toward the raised star shaped greener umbilicus, pendant, the stalks or peduncles pale green.

A rather characteristic species, extending from Laguna and Tayabas provinces southwards to Samar island.

Ficus minahassae Miq.

Notes for 14475:—Stocky tree, on stony ground of secondary forests at 750 feet; stem 10 inches thick, 20 feet high, crooked, subterete, branched toward the top; main branches widely spreading, freely rebranched, forming an umbrella shaped crown; wood soft, dingy white; bark smooth, grayish white blotched; leaves chartaceous, mainly horizontal, the hairs on the suberect green tips and petioles are of a stinging nature; tubercles from stem and branches, numerously branched, descending or pendant, long and relatively slender, flexible; fruits clustered into globose heads whose short stalk is thick; figs angular, green and hard, finally the sides yellowish and the apical or widest portion red and with a few blunt whitish colored excrescences.

This is our most characteristic of Philippine figs, and has been collected on most of our islands. In my opinion, the leafy portion on the type sheet of *Ficus kalingiaensis Merr.* is exactly that of *Miquel's* species, while the fruiting portion on the type sheet belongs to some other species.

Ficus olivaceus Elm. n. sp.

A low or stocky tree; stem 2.5 dm thick, terete, suberect, 7 m high, its main branchës arising from below the middle; wood dingy or yellowish white, soft, ringed; bark dull brown or gray, smoothish; branches widely spreading and repeatedly rebranched, forming a dense umbrella shaped crown; ultimate branchlets 5 to 8 mm thick when dry, terete, longitudinally striate or winkled, densely brown puberulent but soon turning glabrate, slightly curved upward, the terminal portion rather thin. Leaves widely scattered, alternate, mostly ascending, chartaceous, recurved toward the apex, otherwise flat, paler beneath, drying yellowish brown on both sides or olivaceus beneath, entire or the younger ones minutely apiculate above the middle, glabrous except the nerves and midrib beneath, numerously and minutely white dotted on both surfaces but not scabrous, apex acute to well acuminate, base subcuneate to broadly obtuse, seldom a trifle inequilateral at or toward the base, the larger laminae 6 by 15 cm, the smallest ones 2 by 5, but most of them 4 by 10 cm, widest across the middle or just above it, oblong in general outline; petioles 1 cm long more or less, very thick, tawny puberulent, channelled on the flat upper side, wrinkled in the dry state; midrib raised beneath, darker or deeper brown and clothed with an appressed puberulence, ultimately glabrate; nerves similar in color and with appressed hairs, 4 to 6 on each half of the blade, oblique and upwardly curved, the basal pair less prominent than the middle ones, tips obscurely united or anastamosing; cross bars evident as are also the fine reticulations from both sides; bud bracts oblong and acuminate, 1 cm long more or less, densly appressed hairy on the outside, the old or exposed pubescence gray, that on the inner protected bracts reddish brown. Tubercles from the stem and main branches, 3 to 12 dm in length, flexible and pendant, rebranched, chiefly gray in color and glabrous; figs strongly compressed, 1 to 1.5 cm across, dark green and radially ridged above, whitish beneath, sprinkled with brown spots, reddish puberulent or pulverulent; peduncle angular, greenish and brown, with scales or hairs, finally glabrate, 1 cm long, recurved, at the distal end bearing 3 small more or less pubescent bracts; umbilicus flat or only slightly raised, 5 mm across, the orifice closely guarded by imbricate scales; peripheral scales very broad and short, thickly coriaceous, appressed only on the upper side; the upper ones with their obtusely rounded apices protruding, ovately elliptic, coriaceous, entire, the middle region densely brown spotted, 2 mm long, the innermost ones more oblong in shape; syconium relatively thick, coriaceous, the inner surface sparsely yellowish brown ciliate; flowers all fertile, numerous, of different stages; pedicels of the older ones nearly 2 mm long, dull yellow; perianth similarly colored, membranous, 1.25 mm long or much shorter in the younger flowers, gradually thickened toward the truncate or merely apiculate apex, glabrous; exocarp of the ovary becoming easily detached with the stigma, dull brown, obovoidly globose; achenes elongated, somewhat keeled along the edges, a trifle compressed, stramineus, hard; style subterminal, 0.75 mm in length, reddish brown, terminated by a darker brown stigma.

Type specimen number 17098, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, August 1916.

Discovered in light woods among grass covered glens or flats of the mountain at 2500 feet above sea level. Distributed under a name already used. Its fruits and long pendant tubercles distinguish it from *Ficus cuernosensis Elm.* and *Ficus peabodyi Elm.*

Ficus sorsogonensis Elm. n. sp.

A medium sized tree; stem 2.5 dm thick, 6 m high, terete, branched from the middle; wood soft, sappy white, with plain concentric rings; bark smooth, mottled, with latex; main branches widely spreading, rebranched, the branchlets terete, slightly roughened, ground colored when dry; the twigs relatively slender, ascendingly curved, the angular young apical portion densely covered with a dark reddish brown pubescens, harsh when old. Leaves alternatingly crowded toward the ends, thinly chartaceous or submembranous, paler green beneath, flat, mostly horizontal, glabrous on both surfaces except the midrib and nerves beneath, the upper side minutely yellowish white puncticulate and somewhat scabrous, diverse in size, all oblong in general outline, inequilateral especially below the middle and toward the base, the wider half occasionally coarsely undulate along the edge, entire or hispidulous, the lower side golden or yellowish brown when cured, apex gradually acute to acuminate, base broadly obtuse to subrounded, blades 9 to 22 cm long, 4 to 9 cm wide across the middle or widest portion; petioles 1 cm long more or less, densely fulvous ciliate, leaving small scars and rings after falling; midrib straight, dividing the blade into sightly unequal halves, ridged, yellowish in the fresh state, ferruginous hairy or ciliate, flat on the upper side; nerves 6 to 9 on either side of the dark midrib, similar in pubescens and color of the fresh and dry states, ascending, their tips faint and ascendingly curved, cross bars very evident below, reticulations minute; bud bracts 1 to 2 cm long, setaceously lanceolate, ferruginous pubescent on the exterior, early falling. Tubercles long, pendant, cauline, flexible, greenish to dirty brown, the final parts slender and glabrous; peduncle glabrate, ebracteate, usually recurved, 1.25 cm long, obscurely angular; receptacles obovoidly globose or more compressed when dry, nearly 2.5 cm across, pale green but turning whitish toward the base when ripe, with many rugose ridges from base to umbilicus, rubiginous scurfy between the ridges in the dry fruits; umbilicus bluntly conical; the upper bracts ascending, imbricately overlapping, broader than long, leathery and rugulose on the outside; the middle ones horizontal, 2 mm long and broad, ovately triangular, submembranous, purplish streaked and spotted, thickened at the base; the inner bracts deflexed, triangularly oblong; syconium fleshy, the inner surface provided with dense yellowish brown 1.5 mm long hairs; flowers staminate and gall; male in the umbilical region, nearly 3 mm long, provided at or near the base with a 3-lobed reddish brown involucre; pedicel 2 mm long, crooked and angularly compressed, quite narrowed toward the base; perianth entire and covering the monandrous stamen, mucronulate at the apex; filament short, below united to the perianth; anther 0.75 mm long, broadly oblong, compressed, bifid at the rounded base, obtusely rounded at the apex; insect ovary subsessile to 2 mm long stalked, the younger ones ovoidly angular or compressed, subtended by an obliquely truncate perianth 1 mm in length, the 3 lobules merely apiculate; mature ovary ellipsoid, 1.5 mm long, reddish brown; style sublateral, 0.5 to 0.75 mm long, terminated by an oblique lighter brown enlarged stigma.

Type specimen numbers 16391 and 15465, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June 1916 and November 1915 respectively.

Discovered in dry woods at 750 feet altitude. Apparently nearest to *Ficus carpenteriana Elm.*, but fruits and infructescence entirely different.

Section 3. - **Tuberculatae.**

(T. - curtifructescens)

Ficus castanea Elm. n. sp.

A small or shrub like tree; stem 15 cm thick and 7 m high, subterete, crooked, branched from below the middle, the primary branches ascending, ultimately numerously rebranched; wood soft, light, white; bark brown and gray mottled, lenticelled, with latex; twigs terete, hollow, 1 cm thick or thinner, the young or apical portion densely covered with a brown scurf and yellowish white ciliate hairs. Leaves large and few from the ends of the branchlets, subchartaceous or submembranous, mostly horizontally spreading, somewhat darker green upon the upper face, the young ones more erect and distinctly yellowish green on the plant, curing brown especially so on the castaneus lower surface, the upper side in the dry leaves often blotched with small circular grayish white spots, entire or only obscurely a trifle wavy or undulate, my largest blade 3 dm and 3 cm long, 14 cm wide at or a trifle above the middle, the others a little smaller, glabrous and smooth on both sides except the midrib and nerves beneath, the lower surface only dotted with minute sulphur colored spots, oblong in general outline, the top gradually tapering to the rather slender and acuminate point, base obliquely rounded and with a slight cordate indication, otherwise equilateral; midrib keeled beneath, sparsely yellowish white ciliate, its upper side glabrate with age, deeper brown beneath; nerves less prominent but similar otherwise, 9 to 12 including the two short basal pairs, oblique, tips ascendingly curved and faintly united; cross bars faint yet quite evident, reticulations fine; petioles 2 cm long, very thick, densely covered with a mixture of brown scales and yellowish gray bristle like hairs; bud bracts as long, similarly hairy around the base, the upper portion glabrous and slenderly pointed. Tubercles mainly cauline or along the branches, from 1.5 to 3 dm in length, repeatedly short and divaricately branched, the main branches rigid and woody, the ultimate ones short, rather slender and rusty brown when dried; peduncle less than 1 cm long, tawny pubescent, at its distal end usually with 1 to 3 short involucral bracts closely appressed to the syconium; receptacles short ellipsoid or subglobose, nearly atropurpureus with light brown spots, 2 cm long, in the blackish brown dry state strongly and rugosely wrinkled from the top toward the base, glabrous, occasionally a fruit or two was found in the leaf axils; umbilicus deeply sunken, relatively wide, the rim rugosely ridged and thick; bracts on the inner side of the umbilical cavity thickly coriaceous, inwardly pointed, about 2 mm long, broader than long, margins rather thin; the horizontal middle ones broadly ovate, subcoriaceous, few reddish brown veined and minutely spotted, glabrous; the innermost ones inwardly pointed, similar in texture, 3 mm long by 1.5 mm wide toward the truncate base, obtuse at the apex, the reddish brown midvein conspicuous, edges minutely hairy; syconium thick and leathery, only sparsely ciliate on the inner side; flowers all fertile; young ones upon slender, dark reddish brown crooked stipes, with compressed similarly colored obovoid ovaries, the subterminal 1.5 mm long style slender and terminated by a dark short clavate stigma; mature floret 4 mm long; the basal one half crooked and angularly compressed, stipitate, closely surrounded by a perianth boot which at the apex or just below the ovary is usually very short, 2 or 3-lobulate but often merely truncate; ovary fully 1 mm long or thick, obovoidly globose or compressed ellipsoid, the achene hard and minutely pitted, exocarp easily separating with the much crooked style.

Type specimen number 14821, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Found in wet sandy soil among bowlders, along a deeply shaded stream bank at 1000 feet elevation. From *Ficus merrittii Merr.* our plant differs in having larger leaves, more numerously nerved, castaneus brown beneath, with a different apex and in having much shorter and thicker petioles; fruits ellipsoid or subglobose, not obovoid, and upon much shorter peduncles. These same differences hold good when compared with *Ficus binuangensis Merr.* which to me seems nearer related to *Ficus merrittii Merr.* than to *Ficus inegrifolia Elm.* Leaves quite similar to *Ficus wenzelii Merr.* but infructescence dissimilar.

Ficus compressitora Elm. n. sp.

A small erect tree; stem crooked but terete, 2.5 dm thick, 7 m high, branched from below the middle; wood soft, whitish, ringed, covered with a gray to brown mottled bark; primary branches spreading, repeatedly rebranched; the flexible branchlets erect or ascendingly curved, reddish brown, finely scale covered and flaking, the young leaf bearing tips puberulent, terete, 5 to 8 mm thick. Leaves alternate, horizontal or the lower ones descending, the upper ones ascending, flat except the recurved tips, pale green beneath, sublucid above, glabrous, when dry nearly black on the upper and light brown on the lower face, entire, elliptically oblong rather than rotund, the average blades 5 by 10 cm, apex abruptly extended into an acuminate point, base obtusely rounded and occasionally a trifle inequilateral, subcorciaceous; petioles 1.5 to 3.5 cm in length, ultimately glabrate, quite slender, flat or grooved along the upper side, marked with a light yellowish brown ring on the twig at the point of attachment, leaf scars not prominent; midrib dark brown beneath on my specimens, very pronounced, caniculate on the upper side; nerves 3 to 5 on a side, similar in color but less prominent, the basal pair much more ascending; cross bars quite evident, reticulations not evident to the naked eye; bud bracts 1 cm long, broadly lanceolate, finely pointed, canescent on the dorsal or exposed sides, deciduous. Fruits clustered upon very short and rigid tubercles along the branches; peduncles subpendant, 2 cm long, bracteate toward the end, green, very flexible; receptacles hanging, flatly globose or wheel like, very pale green, 2.5 to 3.5 cm across but considerably shrunken in the nearly blackened dry condition, smooth and sublucid, when mature quite soft and light yellowish green, rough or wrinkled when dry; umbilicus depressed, the sides rugulose; upper scales short and apiculate, thick, more or less roughened; the inner ones thinner, brownish, ovately oblong, obtuse to subtruncate, the broad apex frequently slightly lacerated; syconium soft and fleshy; stamens very few, scattered in the umbilical region, monandrous, 1.5 mm long; perianth nearly as long, subentire, membranous, brownish, relatively thick from the base up; filament also black; anther 0.66 mm long or as long as the filament, ellipsoid; insect flowers subsessile or pedicelled and as long as the male flowers; perianth thickly surrounding that portion below the ovary, oblique and usually 3-denticulate at the apex; ovary globose, smooth, 1 mm in diameter, dark or dull reddish brown, the old ones with circular holes at the apex; style nearly black, ascending from the lateral side, thick, 0.33 mm long, terminated by a yellow minutely infundibular stigma.

Type specimen number 14461, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Collected this fig tree in stony dry ground among bowlders in woods at 500 feet altitude. It differs from typical *Ficus integrifolia Elm.* by its thinner leaves which are more elliptic than rotund in shape, and whose petioles are less than half as long. Our fruits are twice as large and far more compressed.

Ficus heteropoda Miq.

Notes for 16205 and 15493:—A small tree in rocky ground of the parang formation at 750 feet; stem crooked, 8 inches thick, 20 feet high, terete, branched from the middle or below it; main branches widely spreading, rather freely rebranched; wood concentrically marked, sappy white, soft; bark with latex, smooth, grayish white mottled; leaves chartaceous, shallowly folded, horizontal, much paler green beneath, diverse in size; tubercles short, rigid, rebranched, cauline from the ground to the limbs; peduncles of the fruits greenish though ultimately becoming red as the mature figs; receptacles obovoidly globose, one half of an inch in diameter, luteus to aurantiaceus, with coarse castaneus lenticels, very numerous and densely clustered, sometimes completely concealing the stem and then the contiguous clusters affording a sheltered home for ants; florets reddish tinged.

Common in the middle and southern Philippines, very little collected in the north Luzon region.

Ficus ilangoides Elm. n. sp.

A medium sized tree; stem subterete, 6 dm thick, 14 m high, buttressed at the base; wood soft, nearly tasteless and odorless, dingy or sappy white, with circular or annular rings; bark smooth or nearly so, thick, gray and reddish brown mottled; main branches few, chiefly toward the top, ascending or more widely spreading, crooked, ultimately rebranched; twigs lax, ascending, yellowish green when fresh, curing reddish brown, glabrous, finely ringed at the leaves or leaf scar attachments, numerous and forming masses. Leaves ample, alternately clustered toward the ends of the branchlets, horizontal or descending, thinly coriaceous, curvingly folded upon the upper much deeper green surface, the entire margins more or less wavy especially toward the twisted or recurved apex, curing unequally brown on the upper and lower surfaces, laminae 5 by 10 cm, more often smaller, occasionally longer, broadly or subtruncately rounded at the base, gradually tapering to the sharply acute to acuminate apex, ovate to ovately oblong; midrib brown on both sides of the blade, ridged beneath, plane above; nerves 3 to 5 on a side, ascendingly curved especially toward their faint ends which are reticulately anastomosing, brownish, equally visible from both sides, reticulations fine but rather obscure; petioles very slender, varying from 1 to 5 cm in length, glabrous; bud bracts setaceously pointed, glabrous, 4 to 7 mm long. Infructescence along the larger branchlets or below the foliage; tubercles straight and at right angles with their branchlets, 3 cm to 3 dm in length, the longer ones only seldom short branched, usually single but sometimes 2 or 3 arising from the same base, not rigid, greenish gray on the tree; figs clustered toward the ends, widely spreading, greenish, smooth and glabrous, ellipsoid or obovoidly ellipsoid, 1.25 cm long more or less, upon very slender 2 to 3 cm long peduncles; bracts 3, short ovate, subtending the fruit or upon the peduncle a short distance below it; umbilicus subconical, the small orifice surrounded by a thick rugose rim; bracts of the upper portion of the orifice horizontal, coriaceous, less than 1 mm in length, broadly rounded; the inner bracts deflexed, gradually becoming longer, the innermost ones 2 mm long by 0.5 mm wide, oblong, submembranous, brownish; syconium quite thin; flowers all fertile, the younger ones subsessile or sessile, the old or mature ones upon a 0.5 mm long rigid dark brown pedicel; perianth segments 3 or 4, unequal, 1 mm long or shorter, glabrous, similar in color, narrowly oblong or lanceolate, acute at the apex, persistent, in the mature state somewhat reduced and frequently appearing only 2 very unequal opposite parts; ovary hard, dark or reddish brown, subglobose, compressed when young, 1.25 mm thick; style straight, divaricate, slender, similar in color, attached on the middle side of the ovary or even below the middle, bearing a clavate light yellow equally long rugose stigma.

Type specimen number 15121, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Collected in compact and well drained red soil of wooded ridges at 1000 feet altitude. Somewhat similar to *Ficus garciae Elm.* but leaves, infructescence and fruits dissimilar. This same species has also been collected on mount Maquiling by the writer and by *Brown.* The shape and cluster of fruits reminded me of the infructescence of ilang-ilang or *Canangium odoratum* (*Lam.*) *Baill.*

Ficus integrifolia Elm.

Notes for 14859, 16070 and 15282:—Small or medium sized trees in rich moist ground of wooded inclines or bordering woods of open grass patches at 1500 feet; trunk 6 inches to 2 feet thick, round, 15 to 35 feet high; branches from the middle, spreading, crooked, numerously rebranched toward their ends; wood soft, whitish, covered with smooth and grayish white bark; twigs short, flexible, ascending; leaves coriaceous, their ascending petioles greenish to brown, darker green above, flat and horizontally spreading; tubercles short and rigid, chiefly from the main branches; receptacles subpendant, globosely obovoid, nearly one inch across or smaller, lucid and smooth, hard, dull green, the exposed sides turning reddish brown, with a long stipe like base; florets dirty brown.

Typical specimens known from most of our islands except Palawan.

Ficus nota (Blco.) Merr.

Notes for 16432 and 14448:—A shrub like or small burly tree in the woodland hills or in rich ground of the Manila hemp fields; stem crooked, 8 inches thick, 15 to 20 feet high, branched from or below the middle; branches widely spreading, forming a flat crown; wood very soft, light, covered with gray and brown mottled bark; the bark is lenticelled or excrescent and contains ample latex; leaves chartaceous, flat, chiefly horizontal, sometimes conduplicate on the upper darker green surface, upon rusty brown petioles; infructescence along the larger branches but mostly cauline; the tubercles short, woody, very rigid; receptacles 1.5 of an inch thick, flattened at both ends, rusty green or brownish, obovoidly globose, with lime spots, of various sizes in the same dense clusters; young florets pink, the mature watery white ones soon becoming rotten.

Ants infest the ground covered infructescences. Rather common throughout our parang formation of the foothills.

Ficus repandifolia Elm.

Notes for 16277, 16213, 15597, 15222 and 15248:—A small or orchard like tree in fertile moist ground of thinly wooded ridges or in Manila hemp fields at about 1000 feet; stems 5 to 8 inches in diameter, 15 to 20 feet high, terete and nearly straight, branched from about the middle; wood soft, dingy white, light in weight; bark smooth, the older part brownish, otherwise grayish mottled; main branches ascending, freely rebranched; leaves mostly toward the ends of the twigs, horizontal or descending, leathery or coriaceous, darker green upon the upper smooth side, their ascending petioles brownish, yellowish green beneath; tubercles very short and clustered along the branches and branchlets, sometimes cauline; fruits or receptacles subpendant, their peduncles which are yellowish green and quite flexible, sometimes in large dense clusters, sometimes with only a few fruits, shining, flatly globose, less than one half of an inch thick or even larger, green but turning yellowish to finally red, hard but soft when ready to fall.

Sterile plants were observed with much larger leaves whose upper margins were coarsely dentate or with few sinuate lobes, much like as in *Ficus grandidens Merr.*

Ficus satterthwaitei Elm.

Notes for 16644, 15074 and 14588:—A small erect or medium sized tree in fertile humid forested flats or ravines at about 1500 feet; stems 8 to 18 inches thick, 20 to 30 feet high, subterete, their main branches arising from below the middle; wood dingy white, concentrically ringed, soft, light in specific gravity; bark thick, smooth, more or less grayish white blotched or mottled, with latex; primary branches crooked and widely spreading, finally numerously rebranched; twigs relatively lax, greenish, usually ascending; leaves subcoriaceous, flat, only the tips recurved, darker green above, ascending or horizontal; tubercles of the infructescence cauline and along the larger branches, from a few inches to 10 inches in length, woody, rigid, divaricately spreading in all directions, dirty brown; peduncles limp and herbaceous; fruits pendant, sometimes axillary, subglobose to obovoid, the top often much compressed or impressed, from 1 to 3 inches across, greenish, with yellowish white spots which become brownish with age, in the mature state turning dull yellowish toward or at the basal portion, radially rugose and ringed or irregularly star shaped ridges from the umbilicus; florets deep red or purpureus.

Apparently quite variable, especially in the size and shape of its fruits which often have on the flattened top peculiar markings, something like those on *Ficus appendiculata Merr.*

Ficus variegata Blm.

Notes for 14787:—Large tree on a ridge at 1500 feet; trunk 2 feet in diameter, terete except the buttressed base, chiefly branched from the middle or from above the middle, 40 feet high or higher; wood soft, white; bark thick, yellowish with gray blotches, the older bark roughened and more or less cinnamon brown; branches widely spreading, the ascending twigs rusty brown; leaves thickly coriaceous, smooth and shining on the upper darker green surface, curvingly folded upon the upper side, tips recurved; fruits hanging in small clusters upon very short and rigid tubercles from the primary and secondary branches; receptacles obovoidly globose, at least one half of an inch across, green but turning yellow when mature, their peduncles very flexible; florets brown.

The younger leaves are often undulate or even dentate. Well dispersed over all of our islands but nowhere common. Its brown bark color is very characteristic.

Section 4. - **Strangulares.**

(S. - pedunculatae)

Ficus longipedunculata (Merr.) Elm.

Notes for 14436:—Usually epiphytic and strangling in habit, in wet black ground along water courses of the

Manila hemp fields at 250 feet; stem or stems messed about another tree up to 30 feet; main leaf bearing branches widely spreading, repeatedly branched, the twigs ascending; wood soft and white; bark bleeding with latex when cut, smooth, grayish white mottled; leaves rigidly coriaceous, terminally clustered, descending to ascending, conduplicate upon the upper much deeper green and shining surface, the large stipular bracts usually persistent; receptacles from the lower leaf axils or from the axils of the scars below the foliage, hard and green, smooth, with numerous dark reddish brown spots, marble round or nearly so, wrinkled when dry, upon stout compressed peduncles, umbilicus flatly rounded, usually the lower half of the syconium becomes densely or numerously punctured and yellowish when mature.

Ficus prasinicarpa Elm. n. sp.

A large and old strangler; stem or stems very irregular and messed, 2 to 3 m across near the ground, 15 or more m high, its original host dead and decayed; the leaf bearing branches toward the top very widely spreading; wood dingy white, concentrically marked, soft; bark mottled, smooth or lenticelled, with latex; branchlets lax and numerous, mainly ascending, terete, the apical portion glabrous and obscurely wrinkled in the dried specimens, slender. Leaves mainly crowded toward the ends of the ascendingly curved twigs, alternate, submembranous, leaving ringed marks after falling, ascending to horizontal, nearly flat but with abrupt tips, lucid above, much lighter beneath, glabrous, when dry subolivaceus beneath, dull brown above, entire, rugulose, elliptic, rounded at both ends, at the top abruptly constricted into an acuminate 1 cm long point, the largest leaf blade 5 by 10 cm, the smaller ones only half as large, most of them between these sizes, fumosus beneath when dry, brownish above, subcoriaceous; midrib stramineus and raised beneath, impressed along the upper side; nerves relatively very obscure, 5 to 7 on each half of the blade, strictly ascending and subparallel, the basal pair most prominent and more ascending, tips faintly interarching, reticulations fine and more evident on the upper side; petioles varying from 1 to 4 cm in length, very slender, deeply channelled along the upper side, smooth; bud bracts ovately acute, 3 to 5 mm long, grayish brown puberulent on the outside. Figs or fruits copious, mainly scattered along the twigs, occasionally from the lower leaf axils, subglobose, 5 to 8 mm in diameter, glabrous, the syconium yellowish brown, when dry very soft, when mature exactly prasineus in color, with relatively large brownish spots in the upper half of the fruit, dry fruits rugulose and obscurely punctulate; the subtending involucre comprised of 3 blunt segments, papyraceous, also glabrous; stipe or pseudostalk 3 mm long, at the base with a vestige of bracts, greenish in the fresh state, not of the fig color; orifice of the umbilicus circular, minute, smoothly rounded, brown in the dry state; the outer bracts triangularly ovate, very small, coriaceous, horizontal; the interior bracts inwardly curved, membranous, brownish or subhyaline, 1 mm long, subtruncate at the apex, oblong; syconium rather thin, soft and fleshy; flowers mostly gall, with a few staminate ones; male flowers in the region immediately below the umbilical scales, subellipsoid, sessile, 1 mm long; perianth membranous, brown, completely enveloping the monandrous stamen, ultimately becoming dissected into 2 very unequal lobes; glabrous anther upon a short subhyaline stalk, broadly oblong or subellipsoid, the obliquely placed cells well separated toward the base; young gall flowers nearly 2 mm long, abovoidly elongated, brown, glabrous, slightly constricted toward the base, subsessile; perianth segments united about the pseudostalk, 1 mm long at least, mostly oblanceolate, unequal; ovary compressed obovoid, obtusely rounded at the apex, narrowed toward the base, the mature insect containing ovary subangularly globose; style lateral, 1.25 mm long, filiform, on the old ovaries merely apiculate.

Type specimen number 16129, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, May 1916.

Collected in moist ground of humid shallow ravines at 1000 feet elevation more or less. It is not *Ficus concinna Miq.* by its leaves and fruits. Neither can it be referred to none of the following socalled synonyms, *Ficus glabella Blm., Ficus arayatensis Warb.* and *Ficus parvifolia Miq.* More distantly related to the *Ficus nuda Miq.* or *Ficus benjamina Linn.* groups.

Ficus pruniformis Blm.

Notes for 16438 and 15404:—A rambling and scandent climber or strangler on dry wooded ridges or in open woods among bowlders along stream beds at 1250 feet or at lower altitudes; stems irregularly messed about the 1.5 foot thick trunk of an *Eugenia*, 20 to 30 feet high or rambling over bowlders; main branches relatively short toward the top or alternatingly branched when horizontally spreading, terete or nearly so, very tough and rigid; the doughy white wood covered by smoothish more or less mottled bark; leaves horizontal, chartaceous or rigidly coriaceous, shallowly folded and recurved toward the apex, somewhat paler green beneath; figs axillary, solitary or in pairs, angularly terete or obscurely sided, ellipsoid, 0.75 of an inch long, dull yellow when mature, hard and smooth with spots, exceedingly wrinkled in the dry state, more tapering toward the bluntly rounded umbilicus; florets dull yellow and filling the entire cavity.

Our pendantly recurved peduncles are twice as long as those on *Blume's* species.

Ficus stipulosa Miq.

Notes for 16232:—Originally epiphytic, now a big tree in woods skirting water courses in the Manila hemp fields at 750 feet more or less; root stem or stems divided or rather interlaced, irregularly terete, fairly straight, 30 feet long, well anchored in the ground, some of the interlaced portions 6 inches thick at the ground and twice as thick at the top or leaf bearing parts; branches long, freely rebranched and divaricately spreading; wood soft, sappy white; bark containing an abundance of latex, blotched, smooth except the brown lenticels; twigs short, chiefly ascending; leaves more or less crowded at the ends of the branchlets, mainly ascending, nearly flat, coriaceous, tips recurved, paler green beneath, the long petioles and midrib greenish white, deciduous for a portion of the season, the young leaves enclosed or surrounded by long and membranous bracts which soon disappear; fruits numerous, along the twigs in small clusters, stramineus, very soft and ater or ardesiaceus black when ripe especially the spots on them.

Its completely deciduous character and the large stipular bracts preceding the new crop of leaves is rare and most peculiar among our figs. Apparently allied to *Ficus argentea Blco.*

Section 4. - **Strangulares.**
(S. - sessiliflorae)

Ficus auranticarpa Elm. n. sp.

A subepiphytic shrub; main branches or stems repeatedly rebranched, the branchlets rather lax and thin, the apical portion of the twigs yellowish brown on our specimen, glabrous except the brush of yellowish to reddish brown hairs remaining in the fallen leaf axils, the leaf scars are not prominent. Leaves alternate, nearly flat, more or less crowded along the branchlets, ascending or horizontally spreading, coriaceous, smooth and glabrous, oblong in shape for all sizes, entire, sublucid and darker green above, curing grayish brown, obtuse to obtusely rounded at the apex, base rounded and obscurely auricled, the smaller blades 2 by 5 cm, the larger ones 7 by 17 cm but with all intergrading sizes, the upper surface minutely yellowish gray puncticulate; midrib ridged beneath, plane above, lighter or yellowish brown, also glabrous; nerves 6 to 9 on each or either side of the midrib excluding the few scattered secondary nerves, similar in color but less pronounced than the midrib, subdivaricate except the much ascending subbasal pair, the ascendingly curved tips finely interarching; cross bars and the minutely messed reticulations very evident from both sides; petioles stout, nearly black in the dry state, grooved along the upper side, from 1 to 2 cm in length, leaving circular scars after falling; inner bud bracts 5 mm long, setaceous ciliate around the base, deciduous. Figs usually in divaricate pairs in the leaf axils or from the axils of their scars and appearing lateral, 1.25 to 2 cm with rich creamy yellow spots, clothed with yellow glistening appressed setae especially toward the top and which soon break off and disappear; its subtending bracts thin, widely spreading, persistent; each of the 3 bracts ovately orbicular, 4 mm across, the central and basal outside portion usually pubescent; umbilicus rounded, the orifice somewhat irregular, topped by 3 very thick and short bracts; the inner bracts not numerous, submembranous, all ascending, at least 2 mm long, 1.5 mm wide across the much broadened base, brown but edges subhyaline, glabrous, tapering from the base to the acuminately pointed apex, the inner ones narrower but more pointed; syconium coriaceous, hairless on the inner side; male flowers monandrous, chiefly scattered in the upper one half of the cavity especially toward the umbilicus, the longer ones 4 mm in length, the basal one half stipitate; the single anther covered in the early state by the entire perianth which in the old state divides into 2 broadly unequal lobes; filament brown, 1 mm long; anther broadly ellipsoid, curved and somewhat obliquely set, a trifle longer than the filament, fully as broad, bifid at both ends; sterile or gall flowers subsessile or long stalked as the staminate flowers, chiefly below the middle of the syconium but freely intermixed with the staminate ones in the upper region; perianth short, dark red, rigid, obliquely truncate at the top and usually with few sharply pointed apical segments; ovary yellowish brown, ovoidly globose or compressed ellipsoid, hard, usually punctured toward the apex; the young ovary very flat and with a straight dark red sublateral style 1.5 mm in length; stigma minute.

Type specimen number 17186, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, September 1916.

Discovered in woodland hills at about 500 feet altitude. It is a rare fig species in our locality, its figs are orange red to yellow with glistening stinging caducous hairs or bristles. Foliage similar to *Ficus forstenii Miq.*, but fruits entirely different. Also quite similar to *Ficus elliptifolia Merr.*, but our petioles are shorter, fruits only one half as large and with conspicuous persistent bracts. This same fig species has also been collected on mount Maquiling by *Foxworthy.*

Ficus benjamina Linn.

Notes for 16038 and 14975:—Originally epiphytic and developing into a strangling tree, on a wooded ridge or in the canyon at 1750 feet; stem coarsely messed, in the first number its host tree is still living, in the latter its host is completely obliterated and its irregular interlaced trunk is 2 to 3 feet across, 30 feet high or higher; the leaf bearing stems or branches widely spreading at or toward the top, mostly ascending, long, the twigs relatively short and lax;

wood soft, dull white; bark lenticelled or excrescent, smooth when young, grayish mottled, with plenty of latex; leaves very numerous, coriaceous or more rigid, normally horizontal but frequently ascending or descending, sharply folded, tips strongly recurved, shining and a trifle darker green on the upper surface, quite variable in size. Fruits usually in sessile and axillary pairs, one third of an inch thick, subglobose, hard and yellowish green, spotted, when ripe soft and deep red; florets brownish.

Nearly thirty years ago there was published a segregate of this species as *Ficus umbrina Elm.* but which is now considered typical *Ficus nuda Miq.*

Ficus calophylloides Elm.

Notes for 17107:—A lofty tree in open or light woods upon a steep slope at 1500 feet; stem erect, buttressed at or toward he base, 5 feet across with the buttress, 40 feet high to the main limbs; wood as in most *Ficus* species soft and dingy white, plainly ringed; bark thick, dull and light gray mottled, the older bark roughened with excrescences or warts; primary branches thick and quite long, widely spreading, repeatedly branched; branchlets yellowish to reddish brown, usually scurfy, the smooth young twigs sharply angular; leaves quite rigid, shallowly folded, darker green above, with a yellowish green midrib and petiole; fruits solitary or in axillary pairs, smooth, globosely ellipsoid, one inch across, hard, pale green when falling but soon turning flavus or sulphureus in color.

Its general range is from Davao along the Pacific coast northward to Tayabas and Laguna provinces. *Ficus xavieri Merr.* from mount Maquiling seems to be a related species.

Ficus crassicalyx Elm. n. sp.

A lofty tree epiphyte; root branches cleaving or encircling its host and extending downwards; limbs ascending and spreading, coarsely rebranched; twigs rigid, stout, slightly curved upwardly, terete, glabrous, not numerous, 1 cm thick in the strongly wrinkled dry state, reddish brown on my specimens, roughened by the leaf scars. Leaves alternatingly crowded toward the ends of the twigs or branchlets, ascending or more spreading, also rigid, folded upon the upper shining and deeper green surface, entire, wholly glabrous, oblong to narrowly oblong, rounded at the top and terminated by a very short and blunt point, base broadly obtuse to obtusely rounded, the larger blades 7 by 17 cm, the smaller ones 4 by 10 cm, curing similarly brown or subglaucous gray to brown above; midrib very pronounced beneath, also a trifle raised on the upper side and caniculate toward the base; nerves 5 to 7 on either side, far less conspicuous, the basal pair arising 5 mm above the base of the blade and much ascending, the others subdivaricate and only slightly curved, the fine tips of all united into a submarginal vein; reticulations minute, quite evident from beneath; petioles very thick, darker in color when dry than the midrib, flat on the upper side, deeply or widely grooved, smooth, 3 to 6 cm long, leaving large rounded scars upon falling; bud bracts leathery, dark brown when dry, 2 cm long, strongly imbricate, caducous, broad, with a short and acute apex, many, leaving ringed scars after falling. Fruits sessile, in pairs from the leaf axils, 1 to 2 cm thick, subglobose or short ellipsoid, glabrous and shining, the basal portion enclosed by the involucral cup; bracts lucid, 5 to 8 mm deep, very broad and thick, its sides closely overlapping, leather brown when dry, the 3 bracts united at the irregularly truncate base: umbilicus smooth, flatly rounded, completely covered by the thick outer bracts; the inner bracts horizontal, plate like, dark reddish brown except the thinner edges, triangular, 2 mm long, 3 mm wide across the base, the innermost narrower and more pointed toward the apex; syconium not very thick but hard; male flowers in the umbilical region, but also intermixed in the lower region with the gall flowers, long pedicelled, 4 mm in length, at the base surrounded by a 3-setiform involucre; stipe yellowish, gradually thickened toward the apex; the upper perianth portion of 2 or 3 very unequal tooth like segments, dark reddish brown; solitary anther subsessile, compressed, broadly ellipsoid, obtusely rounded at both ends but especially so at the apex, connective nearly black; younger sterile flowers subsessile, subtended at the base by 3 sharply pointed more or less unequal 2 mm long perianth segments; ovary 1.5 to 2 mm across, dull reddish brown but when old dull yellow, obscurely ellipsoid, quite irregular in the younger state; style subterminal, 1.5 mm long, very slender, stigma scarcely enlarged.

Type specimen number 15259, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Found this species inhabiting the forested regions at medium altitudes. Entirely too small for *Ficus clementis Merr.* in leaves and fruits. Neither is it *Ficus clusioides Miq.* or *Ficus everettii Elm.* It is however, nearest related to *Ficus pacifica Elm.*, yet both of these new species are also different from each other in leaves and fruits. My number 17743 from mount Maquiling is exactly the same species as here proposed as new. The field label for 17743 reads "Leaf buds 6 inches long and reddish tinged" but neither my type specimen nor the mount Maquiling specimen are accompanied with such bud bracts.

Ficus everettii Elm.

Notes for 15901:—A large or coarse cleaver on the side of a big tree trunk in a moist deeply shaded ravine at 1000 feet; its root system 2 to 3 feet across, 40 feet high, widely branched toward the top; wood soft, whitish, ringed; bark grayish white, quite smooth, full of latex; leaves rigid or thickly coriaceous, folded, smooth, shining above, paler green beneath; figs usually in pairs from the uppermost leaf axils, flatly globose, one half of an inch in diameter, subtended by 3 distinct yellowish brown bracts, pink and soft when mature.

Ours is not typical. The type of this species has elongated receptacles. The leaves of *Ficus clusioides Miq.* appear truncately or broadly rounded at the broad apex, the fruits are globose and over half of which enclosed by its cupular involucre.

Ficus indica Linn.

Notes for 16637:—Starting as an epiphyte or as a cleaver or even attached to cliffs or sprawling over bowlders, ranging from sea level to 3000 feet in altitude; root stems more or less interlaced about host trees or many branched and tightly attached to rock surfaces, in the former case becoming stranglers and finally developing into selfsupporting irregular tree trunks; leaf bearing branches numerous and very numerously rebranched, long, usually ascending, the ultimate branchlets relatively short; wood and bark as in other cleavers and stranglers; leaves lucid, flat or nearly so, diversely disposed, slightly paler beneath, very numerous; midrib yellowish green; fruits not as many as leaves, sessile from the leaf axils, solitary or in pairs, usually well sunken in the woody twigs, small, globose, hard, of a dark red when mature.

Ficus pacifica Elm. n. sp.

An epiphytic plant; main branches 1.5 to 3 dm thick, terete, ascending or horizontally spreading, rebranched from near the base; wood soft, concentrically ringed, dingy white; bark roughened with excrescences, mottled, with ample latex; twigs or branchlets rigid, similarly disposed, numerous, ascending, rather short and thick, glabrous, much wrinkled and roughened by the old leaf scars, yellowish to gray. Leaves ascending or the lower ones horizontal, alternately clustered toward the ends, much darker green on the upper shallowly folded surface, glabrous and smooth, ridgidly coriaceous, oblong to elliptic or more often obovately so, the entire margins subinvolute, the rounded top terminating in a short blunt point, base broadly cuneate to rounded, widest a little above the middle, the largest blades 18 cm long by one half as wide, the lower or smallest ones 5 by 10 cm, when dry brown beneath and grayish above; midrib yellowish green, raised beneath especially toward the squarrose base, similarly colored when dry, deeply channelled on the upper side; primary nerves 4 to 6 on either side, the stout basal pair much ascending and running nearly parallel to the leaf margin, secondary nerves interspersed here and there, raised beneath, impressd above, ascending but little curved, tips strongly curved toward the apex and interarching; the cross bars with reticulations quite evident beneath; petioles up to 5 cm loeg, sometimes only 2 cm long, thick, glabrous, flattened on the upper side, drying nearly black; bud bracts 1 to 1.5 cm long, caducous, imbricate, coriaceous, quite broad, with a short distinct point, densely yellowish gray, canescent on the outside only. Figs or fruits usually in pairs, clustered in the uppermost leaf axils, angularly terete, hard, less than 1.50 cm thick and 1.75 cm long, smooth, glabrous, turning deep wine red, the short conical umbilicus green, ovately oblong in shape, obscurely punctate toward the subtruncate base; involucral bracts 3, overlapping, greenish, leather brown when dry, thick and rigid, rotately spreading not forming a cup, 5 to 8 mm long, broadly ovate and about as wide, glabrous, more or less ridged along the midrib, persistent on the fruits; the external umbilical scales few, very thick, sublucid, unequal in size; the inner bracts or scales much thinner, reddish brown, obovately oblong, diverse in size, 3 mm long; stamens solitary, in the vicinity of the lower umbilical scales appearing clavate, stipitate, enveloped by a reddish and coriaceous perianth; anther 1.5 mm long, oblong, widest toward the emarginate base, apex blunt, the pollen sacs yellowish, attached to the back on a thick blackish brown connective; pistillate florets longer, stipitate or subsessile, subtended or surrounded at the base by slenderly acuminate bracteoles, irregularly obovoid; perianth closely appressed to the 1.5 mm long stalk bearing the ovary, similar in color but much thinner or submembranous, finally the portion enveloping the ovary becoming 3-segmented, totally glabrous; ovary irregularly obovoid, 2.5 mm long, somewhat compressed; style lateral, usually shorter than the ovary by 1 mm, laterally attached, erect, those of the young florets much longer, yellowish brown; stigma blackish brown, slenderly oblong and much recurved, widest at the oblique base.

Type specimen numbers 16401 and 14463, *A. D. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, June 1916 and October 1915 respectively.

Discovered as a big forest tree epiphyte, its roots forming an interlaced mass about its host, ranging between 500 and 2000 feet in elevation. Manifestly allied to *Ficus pachyphylla Merr.*, but our leaves are more tapering to the base, with relatively few and prominent nerves, not like those in *Calophyllum* leaves. Our fruits are smooth in the dry state, those of *Merrill's* species are very much wrinkled. Neither does it match *Ficus palawanensis Merr.* in leaves and fruits. From *Ficus crassicalyx Elm.* it differs in its involucral bracts, and in the shape and venation of its leaves.

Ficus silvestrei Elm. n. sp.

Subepiphytic and tree like in form, but originally it must have started as an epiphytic plant; stems or rather main branches ascending and widely spreading, freely rebranched; twigs 1 cm thick, rather short or slender, the ultimate portions yellowish to brown, glabrous, strongly wrinkled or angular in the dry state. Leaves alternate, chiefly toward the ends of the twigs or branchlets, subchartaceous or submembranous, the entire margins obscurely undulate or nearly straight toward the base, oblong or subelliptically so, at the top abruptly tapering into a sharp acuminate point, the base rounded and terminating into a pair of small auriculate lobes, 10 by 22 cm but frequently somewhat smaller, widest across the middle, likewise glabrous, curing similarly brown though a shade lighter brown beneath; midrib stout and straight, raised beneath; primary nerves 6 to 10 on each side of the strong midrib, strictly ascending, conspicuously interarching at their ends, occasionally with secondary nerves interspersed, the subbasal pair prominent and much ascending, with a few scattered inner nerves along its lower side in addition to the few short pairs radiating from the basal end of the midrib; cross bars and reticulations faint; petioles 3 to 4 cm long, rather thick, strongly wrinkled, glabrate, leaving rounded scars after falling; inner bud bract short, densely covered with soft silky long hairs. Figs axillary, single or in pairs, ellipsoid, with a thick constricted base, sessile or nearly so and apparently ebracteolate, hard, smooth, 4 cm long by one half as thick across the middle; its syconium thick, composed of two layers, the thin exocarp in the dry state breaking in plates and falling off from the inner portion or endocarp which remains intact is much thicker and upon which the flowers and seeds are inserted; umbilicus short and conical, its protruding scales short and broad, not numerous, overlapping or imbricate; florets densely crowded upon the glabrous syconium, the older or longer ones 6 mm in length, with numerous younger ones intermixed and only half as long, the very young ones subsessile; this class of florets entirely enveloped by a reddish brown involucre; ovary compressed, lighter colored, quite large; style sublateral, long filiform, their stigmatic tips often adnate, dark or nearly black in the dry state; involucre of the gall or longer florets ciliate pubescent, with few to several lance shaped and reddish brown segments; gall ovary ellipsoid, with a subterminal short style which is curved over the top of the gall portion.

Type specimen number 15272, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Collected in the hill forests at medium elevation. Named after *Silvestre Dumo,* en Ilocano youth who proved himself very helpful to me on my Sorsogon expedition. Sent our specimens out under a name previously used. It is similar but not identical to a number of Philippine wild fig species. Possibly its nearest resemblance is with *Ficus camarinensis Merr.*, but our leaves are distinctly auriculate and with a number of small radiating basal nerves; our fruits are thick, hard and smooth, not soft nor pustulate. A more distant relative is *Ficus cordatula Merr.* Under *Ficus altissimo Blm.* genus cover are two specimens from Camarines Sur, 191 collected by *Garcia* and 798 by *Quadras* which seem to be identical with mine.

Ficus (16513 *Elmer* from Irosin).

Stems several from the basal portion of a rotten stump, long and ascending, about 1 dm thick, terete, rebranched from near the base; roots ramifying; wood very soft, dingy white, with a large pith; bark greenish brown, with darker brown excrescences, with a flow of latex. Leaves flat, horizontal or descending, when mature shining and darker green above, the young ones with their petioles densely coverd with a grayish floccose indumentum, soon turning glabrous, the young twigs brownish floccose but also glabrate when old.

Not having seen the fruits, its status remains very uncertain. However, it evidently belongs to the strangling class of figs. Bureau of Forestry number 1291 from Mindoro is sterile but otherwise similar. Number 8542 of the same bureau and also from Mindoro is apparently the same species and which has large ellipsoid fruits, 2 by 4 cm in the dry state, glabrous except at its sessile, ebracteolate base. This large fruited specimen is distinct from the common *Ficus forstenii Miq.* or *Ficus papaya Blco.* Our sterile specimens were sent out with a provisional name. Its early floccose condition is a unique character in this group of figs.

Section 5. - **Axillares.**

(A. - glabratae)

Ficus ampelos Burm.

Notes for 15249:—Small trees or larger, sometimes erect shrubs, scattered in the hill forests at low altitudes: stem terete, not buttressed, 10 inches thick, 20 feet high or higher, branched from below the middle; wood relatively hard, concentrically ringed, white; bark smooth, gray; main branches widely spreading, many times rebranched; branchlets long, slender, flexible, the terminal ones more or less drooping; leaves copious, mainly descending or drooping as the twigs, the younger ones ascending, mostly flat, sublucid above, quite variable in size on the same plant, when dry many of the leaves turn to a bluish green or metalic lustre; figs scattered among the foliage, solitary, in pairs or in small clusters, upon short or longer peduncles, green, light yellow to red upon the same plant.

Common throughout the Philippines, it is quite an ornamental plant and should be planted in our parks.

Ficus angustissima Merr.

Notes for 16101:—A small undershrub in rocky dry ground of wooded ridges at 2000 feet; stem a yard or two high, less than one half of an inch thick, erect, terete, few branched toward the top; wood tough, greenish white, covered with smooth castaneus bark which is without latex; branchlets not numerous, long, very slender, sparingly rebranched; leaves thinly chartaceous, chiefly horizontal, flat but recurved toward the apex, much lighter green beneath, rather numerous along the twigs, the midrib yellowish green, similar in shape but not in size; figs globose, as large as ordinary peas, not numerous, solitary or in pairs from the leaf axils, occasionally few clustered in the axils of the leaf scars, green to yellow, finally reddish brown and soft in texture, swollen when ready to fall.

Its distribution is from Baguio to Davao. Some of the specimens are quite harsh, and in that respect seem to be *Ficus cumingii Miq.* This similarity is also true in the shape and venation of the leaves.

Ficus bakeri Elm.

Notes for 16804 and 16114:—A liana and terrestrial plant climbing lofty trees, in damp forests or along nearly precipitous slopes at 2000 feet; stem 2 to 5 inches thick, rope like or tightly encircling around its support, up to 25 feet high or to the first limbs, with few to several main branches toward the top; wood porous, testaceus toward the center, with brown lenticels, bleeding with latex where cut; branchlets rebranched, forming a stiff tangled mass; twigs short, rigid or the young ones flexible; leaves subchartaceous, flat, much lighter green beneath, copious, ascending or horizontally spreading; fruits abundant, solitary or in pairs from the axils of the leaves or their scars, in the young state dull green and covered with a ground colored indumentum, ashy brown to prasineus when ripe; florets brownish tinged or yellowish in the early state.

Heretofore only known from Laguna and Tayabas provinces of Luzon.

Ficus benguetensis leytensis Elm.

Notes for 14834 and 16405:—Crooked tree or smaller and shrub like in good soil of wooded depressions at 1000 to 2250 feet; stem 5 to 8 inches thick, terete, suberect, 15 to 25 feet high; wood pale white, soft, light in weight, with a faint sweet taste; old bark brown, younger bark gray, containing latex, that on the branchlets often greenish tinged and smooth; primary branches mainly toward the top, numerously rebranched toward the ends; leaves ample, forming a dense or well shaded crown, thinly coriaceous, flat, paler beneath, mostly horizontal, very dark or dull green above, tips recurved; receptacles in pairs, axillary, truncately obovoid, hard and very deep green, 0.50 to 0.75 of an inch long, with creamy white spots; florets flesh red.

Ficus caudatifolia Warb.

Notes for 16477 and 14532:—Starting as an epiphyte, developing as a strangler about its host tree in the form or a messed root system which finally becomes a selfsupporting trunk, or in the latter number it attaches itself to the base of a tree trunk and thereby grows into a stout cleaver, altitude 1000 to 2000 feet; root trunk 25 feet high, completely covering and surrounding its host which was still in a living state, branched at the top; main leaf bearing branches 6 inches thick, 15 feet long, rebranched from below the middle; bark smooth, yellowish gray; wood moderately tough in the branchlets; twigs numerous, forming dense entanglements; leaves chartaceous, curvingly folded, tips abruptly recurved, shining above, paler beneath, midvein and nerves yellowish; fruits pendant, axillary, perfectly globose or marble round, 0.5 of an inch in diameter, profuse on some plants, pale green to orange color and finally strawberry red.

If my *Ficus eucaudata* which is a laxly branched erect shrub, is the same species as *Warburg's,* then it has a great range of adaptation—from a shrub to a tree, rambler to a liana, cleaver to a strangler!

Ficus collinsii Elm. n. sp.

A small or medium sized tree; branches terete, glabrous or puberulent and rusty brown toward the young tips. Leaves alternate from the relatively short lateral shoots or twigs, ascending or horizontally spreading, glabrous but slightly scabrid or harsh on both sides, minutely white puncticulate on either surface, inequilateral especially toward the base, entire or edges rugulose above the middle, the apex short acute to obtuse and occasionally rounded, submembranous, flat, much paler green beneath even in the dry state, grayish brown on the upper surface, elliptic to elliptically oblong, the largest laminae on my specimen 8 by 18 cm, the smaller intermixed ones 4 by 8, base of all oblique and rounded, the halves in most cases very unequal; petioles yellowish brown on the dry materials, 1 to 2 cm long, flattened and doubly grooved along their upper side which is puberulent to pubescent; midrib similar in color to the petioles, shallowly grooved and puberulent above, ridged, glabrous, straight; nerves 5 to 7 on each side of the midrib, rather strictly ascending, conspicuous but apical portion thin and obscurely united, impressed above, the main basal pair more ascending and with secondary nerves along the outer or lower side, often with a minor pair of nerves radiating from the extreme basal portion of the leaf blade; cross bars quite evident, reticulations obscure, distinct from both surfaces; bud bracts 5 to 8 mm in length, coriaceous, strongly involute especially toward their setaceous points, glabrous or minutely ciliate along the edges. Figs axillary or laterally grouped, ellipsoidly globose, glabrous and smooth, 1 cm long in the dry fruits, when young obovoidly globose, upon 1.5 cm long, slender and glabrate peduncles which are usually short bracteate a milimeter or two below the syconium; our umbilical scales coriaceous, horizontal, subrotund, dull reddish brown, glabrous, 1.25 mm across; the middle scales similarly placed, ovately triangular, membranous except the reddish brown midvein, a trifle longer, sides subhyaline; the inner ones hyaline, oblong, deflexed, at least 2 mm long, truncate at the base, obtusely rounded at the apex, less than 1 mm wide, sides minutely reddish brown spotted, all flat and overlapping; inner surface of syconium provided with long silvery white hairs, coriaceous; flowers apparently fertile; perianth nearly 2 mm long including the united basal one third, glabrous, hyaline, erect and well exceeding the pistil, the upper two thirds divided into 5 to 7 or even 9 unequal oblanceolate segments; pedicel of pistil closely surrounded by the basal portion of the perianth, brownish 0.75 mm long, somewhat obliquely expanded at the base; ovary about as long, hyaline, compressed obovoid; style lateral, 1.25 mm long, bent toward the apex, hyaline and thickened at the base, brownish toward the stigmatic portion; stigmas similar in color, slightly enlarged and obscurely oblique, in the young state united.

Type specimen number 15599, *A. D. E. Elmer,* Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Discovered this wild fig tree in the foothills at rather low elevation. Apparently in the alliance with *Ficus haggeri Merr.*, but our leaves do not match that species. Named after a *Mr. Collins,* owner and manager of a Manila hemp plantation.

Ficus confusa Elm.

Notes for 14580 and 15128:—Subepiphytic shrubs lodged in the axils of limbs 15 feet above ground or sprawling over bowlders, in humid woods and in dry thickets at 750 feet; stems solitary or few from the base, terete, 1.25 inch thick, 7 feet long or longer, bendable, repeatedly branched; wood tough, whitish, with concentric marks; bark smooth, yellowish to gray mottled, the young ones greenish tinged, with very little latex or none; twigs very slender, smooth; leaves flat or with recurved tips, coriaceous or submembranous, much lighter green beneath, horizontal or descending, shining on the upper deeper green surface; receptacles well scattered in the leaf axils, in pairs but oftener solitary, glossy, smooth, globose, 0.33 of an inch in diameter, suberect but when mature descending, hard and pale green, then yellowish, finally red; florets yellowish to reddish brown in the mature fruits.

A species really confused with *Ficus subulata Blm.* and *Ficus philippinensis Miq.,* and to a number of other species. It is a difficult group!

Ficus crassitora Elm.

Notes for 14411, 16769 and 16890:—A medium sized tree in fertile ground mixed with stones and bowlders among steep forested slopes at 250 feet altitude or higher; trunk 1 foot thick, 30 feet high, branched from the middle; wood very light, soft; bark roughened below, smooth above, grayish white blotched, with some latex; main branches ascending, the ultimate ones numerously rebranched, the flexible twigs suberect and brown in color; the young paler green leaves erect, the old ones horizontal, nearly flat, subcoriaceous, smooth and glabrous, upon brownish green petioles; the slenderly pointed bud bracts yellowish gray tomentose; receptacles not numerous, single or in pairs from the axils of the leaves or their scars, erect or ascending, globose, 0.5 of an inch in diameter, green and with white spots, lucid, the upper surface becoming reddish brown, with a hard and thick syconium; florets light red.

It is doubtful *Ficus pubinervis Blm.*

Ficus guyeri Elm.

Notes for 14856:—Erect or ascending shrubs in dry ground of a wooded ravine at 1250 feet; stem few inches thick, 10 to 15 feet high, branched from about the middle; wood moderately hard, white; bark smooth, mottled, almost entirely without latex; primary branches widely spreading, the ultimate ones very thin and slender but relatively rigid, the twigs yellowish brown; leaves ample, submembranous or thinly chartaceous, mainly descending and recurved at their tips, paler beneath, sublucid above; receptacles 0.25 to 0.33 of an inch in diameter, globose or somewhat pointed at the small umbilicus, solitary or in pairs from the axils of the leaves or their scars, rather sparse, upon slender and recurved stalks or peduncles, pale green, then yellowish, soft and nearly black when mature.

Critically related to *Ficus validicaudata Merr.* and to *Ficus fastigiata Elm.* on the one hand, and to *Ficus ampelos Burm.* on the other.

Ficus hauili Blco.

Notes for 17160 and 15458:—Usually a small tree, sometimes shrub like, in either dry or wet soil of the valley and the foothills; stems terete but crooked, 5 to 8 inches thick, up to 15 feet high, branched above the middle and numerously rebranched; wood pulpy, doughy white; old bark roughened with excresences, otherwise nearly smooth and grayish mottled; the younger twigs smooth and dull green, the apical portions angularly compressed; leaves copious, forming a densely shaded crown, coriaceous, flat, spreading, with yellowish white midrib, duller green on the upper surface; figs sometimes densely clustered along the tmigs below the foliage, usually from the leaf axils, in pairs or solitary, obovoidly compressed, radially ridged from the base to the umbilicus but especially so across the top, the ridges darker green, densely white spotted, 0.50 to 0.75 of an inch across, at maturity turning yellowish white at the base.

Most widely distributed fig in our Archipelago, and is frequently found growing in yards and fields as a shade tree. If considered as *Blanco's* species it is endemic.

Ficus inaequifolia Elm.

Notes for 17065:—A tree or in our case a small tree climber, inhabiting very humid forested slopes at 3000 feet elevation; stem nearly 1 inch thick or thicker, as long as 20 feet in length, bendable, occasionally branched; the lateral roots rope like and tightly cleaving or binding to its host; main branches divaricate, rebranched, the ultimate ones lax and descending or half drooping; the young twigs ascending, smooth, more or less angular; leaves similarly disposed, submembranous, smooth on both sides, paler beneath, lucid above, flat except the recurved tips, very unequal in size; receptacles solitary or few clustered, often in pairs from the leaf axils, clustered along the branchlets, marble round, 0.3 to 0.4 of an inch in diameter, hard, shining, pale green but with age turning yellowish; florets pale yellow.

This distinct species is easily recognized from the other critical species in this group by its very unequal leaves with different shapes and by their abruptly pointed tips.

Ficus irosinensis Elm. n. sp.

A cleaver with shrub like stem and branches; root system enmessing another tree towards the ground; stem 12 to 18 cm thick or with few main branches from near the base, suberect or ascending, terete, long, the bark mottled; its secondary branches from above the middle, repeatedly branched, finally horizontally spreading; twigs rather thin but elongated, hollow or with a large pith, the older parts glabrous, brownish on my specimens, the young apical portion obscurely angular and covered with a short tawny pubescence. Leaves subchartaceous, chiefly horizontal or the older ones descending, nearly flat, diverse in size, not many but well scattered, our largest blades 14 by 28 cm, the smaller ones 8 by 13 cm, occasionally much smaller ones interspersed, apex short acute, base broadly rounded, not cordate, usually the two halves of the laminae unequal and occasionally the basal portion considerably inequilateral, curing brownish above, greenish brown beneath, oblong in outline, the smaller ones subelliptic, the older leaves slightly roughened or scabrous, the young leaves covered beneath with a short soft pubescence especially along the midrib and nerves, margins entire and roughened, or obscurely and bluntly toothed, seldom with a short and blunt lobation toward the top; petioles from 1 to 4 cm long, the old ones stout, the young ones slender and soft pubescent; midrib of mature leaves very prominent and glabrate beneath, flat and dark brown puberulent on the upper side; nerves also conspicuous beneath, 5 to 7 on each side, ascending, slightly curved, tips anastomosing, the basal pair of primary nerves with secondary nerves along the lower side; cross bars quite evident, reticulations obscure; bud bracts overlapping, 1 cm long, rigid, gradually tapering from the base to their sharp point, puberulent but ultimately glabrous. Figs or fruits mainly axillary or from the axils of the leaf scars, solitary or in pairs, subsessile or upon very short ebracteate peduncles or stalks, globose, 1.25 cm in diameter in the mature state; umbilicus little raised, circular, 4 mm across the flat top; the peripheral bracts ascending, 1.25 mm long, broader across the truncate base, the blackish brown middle portion fleshy, the margins thinner and yellowish brown, the obtusely rounded apices exerted; the innermost bracts nearly twice as long, submembranous, midvein reddish brown, especially conspicuous toward the blunt apex, the yellowish sides minutely spotted, 1 mm wide across the truncate base, gradually tapering toward the apex; syconium soft, fleshy; male flowers clustered in a circle immediately beneath the umbilical scales, diandrous, 1.5 mm long, in the young state thickly obovoid, subtended by a short obscurely lobed or toothed membranous perianth; filaments 0.33 mm long, dark brown, glabrous; anthers a trifle longer, compressed, elliptic, obtusely rounded at both ends and minutely notched, the 2 anthers unequally placed; sterile flowers subsessile or long pedicelled, with a soft membranous perianth whose unequal segments are merely apiculate or slenderly acuminate; ovary ellipsoid, stramineus, 1 mm thick, with a 0.50 to 0.65 mm long dark brown style on its side.

Type specimen number 14460, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Found in light woods along rivulets, bordering Manila hemp fields at a low altitude. In the group with *Ficus ulmifolia Lam.* and *Ficus blepharostoma Warb.*, but nearest related to *Ficus haggeri Merr.* from which our specimens differ in having larger leaves whose bases are not cordate. Our young leaves are pubescent beneath and our fruits sessile or upon short ebracteolate peduncles. My number 17925 from mount Maquiling is apparently the same species.

Ficus mindanaensis Warb.

Notes for 14416:—Rambling shrubs in thickets of embankments along the Irosin river at 250 feet; stems few from the same root cluster, 2 inches thick, terete, ascending, branched from below the middle; main branches not many, elongated, the ultimate branchlets slender with their tips more or less drooping; bark smooth, yellowish to grayish yellow, with brown lenticels, containing latex; wood soft or rather tough, white, odorless and tasteless; leaves chartaceous, large and small ones intermixed, often subpendant for the terminal ones, usually horizontal, flat but tips somewhat recurved, sublucid and darker green on the upper surface, ours finely pubescent beneath; fruits usually 2 from the leaf axils, frequently solitary or clustered along the branchlets, globose, pendant, from 0.50 to 0.75 of an inch in diameter, yellowish red and creamy white spotted: florets whitish.

Primarily a low altitude plant. Specimens with small leaves and fruits suggest broad leafed *Ficus caudatifolia Warb.* It is also closely related to *Ficus parietalis Blm.*

Ficus nervosa Hey.

Notes for 14521:—Small but erect tree in rich soil among light woods of the Manila hemp region at 750 feet; stem straight, terete, 1 foot thick, branched from above the middle; wood moderately soft, yellowish white; bark smooth, mottled, yellowish beneath the epidermis, light yellow next to the wood; main branches widely spreading, with many branchlets, the lax or flexible twigs mostly ascending; leaves chartaceous, horizontal, the older ones descending, the young ones ascending, somewhat folded, paler green beneath; fruits similarly disposed, globose or marble shaped, 0.50 to 0.75 of an inch in diameter, hard, green as the foliage, smooth; peduncles also green, very flexible, bibracteate anywhere between the middle and the base of the receptacles; on most of our figs the bracts form a sort of an obliquely rounded green disk which is grown to the syconium proper; florets brown.

In my opinion the large leafed forest tree published as *Ficus apoensis Elm.* is distinct.

Ficus rubrocarpa Elm. n. sp.

A scandent climber; stem 1.5 cm thick, tough, flexible, 5 m long or high, occasionally branched; wood soft, greenish; bark smooth, brown, green below the epidermis; branches descending, rebranched; the slender twigs very flexible, terete or somewhat compressed toward their tips, yellowish brown when dry, in the early state reddish brown puberulent, glabrate when old. Leaves well scattered, not numerous, alternate, also descending or horizontal, chartaceous, shallowly folded upon the upper much deeper green surface, tips strongly recurved, glabrous except for the few and scattered long bristle like hairs along the midrib beneath, entire or edges slightly rugose, grayish brown above on my specimens, of a deep copper brown beneath, ovately oblong, widest below the middle, the upper half gradually tapering into the sharply acuminate apex, most of the average sized blades 4 by 10 cm on the twigs, broadly rounded at the base, the lower or old leaves 7 by 16 cm and with a broadly cordate base; petiole 1 to 2 cm long, rufous scale and hair covered, medium in thickness; midrib darker brown beneath, conspicuous below, caniculate above, usually with a few light yellow appressed bristles which soon disappear; nerves 5 to 7 on either side of the midrib, oblique, straight, tips ascendingly curved and faintly interarching, less prominent but similar in color to the midrib; cross bars quite evident, reticulations not evident or obscure; the bracts 1 cm long, chartaceous, gradually pointed, the outside only covered with a dense yellowish white appressed tomentum. Figs 5 mm thick, in pairs from the leaf axils or from the axils of their scars along the branchlets, not clustered, globose or obovoidly globose, puberulent or short pubescent when young, the basal portion of the syconium extended into a slender 3 to 5 mm long stipe which at the base is provided with a minute vestige of the bracts; exterior umbilical scales slightly raised, thickly coriaceous, glabrous, short and broadly ovate; the inner bracts oblong, nearly 2 mm long, submembranous, reddish brown; the upper one third of the cavity substerile and densely beset with linear to lanceolate 1.5 mm long brown though glabrous bracts; syconium on the inner surface sparsely provided with white ciliate hairs; examined flowers all fertile, mature in the basal portion of the cavity, immature or sterile in the upper portion; the longer flowers 3.5 mm long, the basal 1 mm pedicel like; segments 4, subequal, fully 2 mm long, linearly lanceolate, acute to acuminate toward the apex, closely adhering to the ovary, glabrous, reddish brown; ovary straw colored, 2 mm long with the subhyaline base, compressed, oblong, acute toward the base and easily becoming detached from the perianth, more obtuse at the subhyaline apex, with a very slender light colored terminal style which becomes much shortened in the mature state.

Type specimen number 14523, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, October 1915.

Discovered as a low or large forest tree climber in dry woods of the foothills at 500 feet above sea level. From *Ficus bulusanensis Elm.* it is separated by its fewer branchlets, fewer and much larger leaves, with more numerous nerves which are entirely glabrous. Our figs are in pairs, not sessilely glomerated nor provided at their bases with conspicuous bracts. Next in relationship comes *Ficus samarensis Merr.* My number 16420 collected in this same region I now regard as a large leafed specimen of *Ficus tayabensis Elm.*

Ficus saxophila Blm.

Notes for 14427:—Large epiphytic shrub or strangling tree, in thin woods of the Manila hemp fields at 250 feet; stem interlaced, 5 feet across, 30 feet high; main branches ascending, widely spreading, freely rebranched, the ultimate ones long and drooping, ascendingly curved at the ends of the twigs; wood very soft, light colored and light in weight; bark smooth, bleeding with latex, grayish white, blotched with darker colors; leaves subcoriaceous, rotately spreading from the ends of the branchlets, mostly descending, flat or nearly so, tips recurved, duller green on the upper lucid surface; figs in pairs when in the leaf axils, sometimes solitary, seldom densely clustered below the foliage, green with lime or milk spots around the umbilicus, yellowish when mature, 0.33 of an inch in diameter, nearly globose; florets brownish.

The leaves, bark and wood have a very skunky or unpleasant odor. Rare and very local in distribution of our islands.

Section 5.- **Axillares.**

(A. - nonglabratae)

Ficus ahernii Merr.

Notes for 14406 and 17022:—Climbing upon a large tree trunk at 250 feet; stem terete, crooked, 1 to 2 inches thick, among other scandent vines reaching a height of 30 feet, repeatedly branched; wood dingy white, not hard but very tough; bark relatively thick, smooth or more or less lenticelled or warty, brown and gray mottled; branchlets crooked and relatively short, horizontally spreading or descending, quite rigid, dark colored; leaves copious, diverse in size, similarly spreading as the twigs, rigidly chartaceous, entirely flat, much duller green above, midrib yellowish, petioles brown, harsh on the upper side, soft tomentose beneath; fig fruits globose, fully 0.5 of an inch in diameter more or less, solitary or in pairs from the leaf axils, occasionally few clustered along the branchlets, soft and deep wine red when ripe.

Mainly in Leyte, Samar, southern and central Luzon. Variable in pubescence, and no doubt it is identical with *Ficus obtusa Hassk.*

Ficus bulusanensis Elm. n. sp.

A scandent terrestrial plant; stem terete, 3 cm thick near the ground, 7 to 10 m high or long, numerously branched toward the top, bendable, twining about its support; wood porous, sweet, dingy white throughout; bark relatively thick, freely bleeding with latex when cut, comparatively smooth and dirty brown; main branches 1 to 2.5 m long, repeatedly rebranched, divaricate or descending, very tough, covered with smooth gray bark, forming tangled masses; twigs quite thin, with ascending tips, relatively short, terete, also tough, ground colored in the dry state, puberulent. Leaves copious, rigidly chartaceous, alternating, ascending, conduplicate, tips strongly recurved, smooth and darker green on the upper side in the fresh state, entire, ascending, ovately elongated or ovately oblong, the larger laminae 4 cm wide below the middle, twice as long, the smaller blades 2 by 5 cm and more or less scattered among the larger ones, base broadly rounded or subtruncately rounded, the apical half gradually tapering to an acute to acuminate point which occasionally is subfalcate, drying grayish above and of a very deep or rich brown beneath; midrib prominent and reddish brown pubescent beneath, grooved along the upper side; nerves of the same color and vestiture, 3 to 5 on either side, oblique, tips ascendingly curved and conspicuously united; cross bars very evident beneath, sparsely puberulent; petioles 5 to 8 mm long, stout, dark or dull brown, covered with a reddish brown pubescens; bud bracts as long as the petioles, leathery, glabrous except the fringe of light and short hairs at the base, broad at the base, sharply pointed at the imbricated apex, fugacious. Figs very numerous, from the leaf or scar axils, in the fresh state nearly 5 mm in diameter, much smaller when dry, between luteus or aurantiaceus in color, irregularly obovoid, soft when mature, sessile but distinctly constricted at the base which is surrounded by a whorl of small papyraceous light brown bracts or bracteoles; bracts rounded, with a fringe of short light colored hairs at the base; umbilicus small, deeply sunken, the orifice surrounded by an obscurely rugose rim; upper scales coriaceous, short and broad, horizontal, glabrous; the inner scales ovate to oblong, submembranous, brownish but margins subhyaline, the innermost ones inwardly pointed, otherwise horizontal; flowers fertile, of unequal stages of development; perianth subcupular, sessile, rigid, dark reddish brown, usually 3-segmented, glabrous; segments unequal, 0.50 to 0.75 mm long, thick at the truncate more or less united base, acute at the apex, tightly attached to the ovary; ovary light stramineus, oblong, usually irregularly compressed in the young state, the mature ones fully 1 mm long by 0.66 mm thick, hard, more or less ridged along one side, obtusely rounded at the base; styles subterminal, 1 mm long or less, slender, their apical portion frequently subunited into a matrix.

Type specimen number 15052, *A. D. E. Elmer*, Irosin (Mt. Bulusan), Province of Sorsogon, Luzon, November 1915.

Gathered in very humid woody ravines of the mountain at 2750 feet altitude. It is far less pubescent than *Ficus recurva Blm.*, our figs are totally glabrous. Neither is it *Ficus puncticulata Merr.* which is a small tree. Our leaves are of a different color when dry, not puncticulate beneath nor slightly cordate at the base. The fruits on our type specimen are yellow to orange red. More distant to *Ficus lanata Blm.* Number 16952 is doubtfully my new species here described.

Ficus celtoides Elm.

Notes for 17046:—A suberect shrub or more or less sprawling over a mass of humus covered bowlders in wet jungled forested flats at 2000 feet; main stem few inches thick, 10 feet long, repeatedly branched from near the base; primary branches 1 inch thick, terete, quite smooth, the bark gray and yellow mixed, with very little milky sap; wood tough and dense, nearly white; twigs thin, brownish yellow; leaves copious or more sparse, erect, horizontal or descending, mostly alternate, occasionally opposite, only a trifle paler green on the nether side, membranously chartaceous, only the tips recurved, coarsely dentate or subentire especially toward the base; figs globose and the size of cranberries, single, in pairs or 3-clustered, chiefly from the leaf axils or from the branchlets, green, yellow and red on the same specimen, representing different stages of maturity.

In the group with *Ficus multiramea Elm.*, *Ficus producta Merr.* and *Ficus euphlebia Merr.*

Ficus celebica Blm.

Notes for 14510 and 15024:—Shrubs from the base of large tree trunks or from the crotches of large limbs of forest trees, not cleaving nor strangling, at 2250 feet altitude; stems few or more from the root base, 1.5 of an inch thick, about 3 yards long, ascending, spreading, branched from below the middle; wood rather soft, also whitish; bark smooth, gray and yellowish marked, with very little latex; branches lax, some of them quite slender, the twigs often quite yellowish; leaves with strongly recurved tips, otherwise flat, slightly rigid or subchartaceous, nearly equally pale green on both sides, unequal in size; fruits in the leaf axils or in the axils of the fallen leaves, sometimes densely clustered along the branchlets, harsh but with maturity becoming glabrate, green and with minute whitish lenticels, subglobose, 0.25 of an inch across, soft when yellowish to red.

Possibly our specimens should be referred to *Ficus pisifera Wall.*

Ficus cumingii Miq.

Notes for 16639:—Erect or suberect shrubs, sometimes inclined to ramble, in open rocky ridges at 2000 feet; the main stem an inch or two thick, 1 to 2 yards in length, rebranched, the branchlets forming more or less dense masses; wood very tough, the smooth old bark gray, that on the rigid twigs chiefly reddish brown, latex none; leaves either opposite or alternate, chartaceous, sublucid and darker green above, tips somewhat recurved, copious; figs subglobose and with a conical umbilicus, up to 0.25 of an inch in diameter, axillary or lateral, sometimes few and scattered, usually more numerous, pale green, yellowish to red.

Leaves of 1944 *Cuming* are linear, opposite, scabrous, with nerves at right angles to the midrib, and with lobular bases on some of them. Leaves on most of our specimens in this group are either opposite or alternate. The shape and venation of the leaves are its primary distinguishing characters from the rest of the nontypical specimens so named. *Ficus angustissima Merr.* may have to be reduced to *Miquel's* species.

Ficus fiskei cebuensis Merr.

Notes for 16425:—Few stemmed erect shrub in dry ground of shrubberries at 750 feet; stem 1 inch thick, terete, 2 yards high, very sparingly rebranched; wood white, rather tough; bark brown, setulose, hypodermis green, white on the inner side, without latex; leaves horizontal in two alternating rows, the ascending petioles flesh red and spiculose, chartaceous, strongly folded toward the base, pale green but especially so beneath, the midrib with its nerves beneath red, margins irregularly lobed or coarsely dentate; figs or receptacles axillary or more often in glomerate clusters along the branches, seldom along the stems, up to 0.5 of an inch thick, globose, the young or green fruits very hispidulous especially toward the umbilicus, soft and wine red when fully mature.

A small group of fig species not widely known in our islands, and apparently running into the *Ficus ulmifolia Lam.* group.

Ficus flavo-cortica Elm.

Notes for 15954:—Epiphytic and subscandent shrubs upon trees, or on the side of tree trunks in very damp densely wooded flats at 1250 feet; main stems few, ascending and widely spreading, 2 to 3 inches thick, 10 to 15 feet long, repeatedly branched from near the base; old bark earth colored, on branches and twigs flavus under the dull brown tomentum; wood whitish, soft, ringed; leaves few, apiculately dentate, flat, membranous to subchartaceous, the terminal ones descending or drooping, paler green beneath, the midrib and nerves yellowish tinged on the lower side; receptacles in small clusters along the twigs below the foliage or sometimes on leafless branches, occasionally solitary or in pairs from the leaf axils, green and white spotted but turning whitish from the base toward the umbilicus, also orange red when ripe; florets pink.

Definitely related to *Ficus viridifolia Merr.*, *Ficus celebica Blm.* and to *Ficus pisifera Wall.*

Ficus jaroensis Merr.

Notes for 16214 and 14847:—Scandent and terrestrial, climbing along big tree trunks up to 25 feet high, in dense forests of a very steep slope at 1000 feet; stem 1 to 2 inches thick, subterete, crooked, bendable, freely rebranched toward the top and forming entanglements; wood porous, soft, dull white; bark gray and brown mixed, excrescent, with latex, the younger bark reddish brown and lenticelled on the branchlets; leaves rigidly chartaceous, folded especially toward the recurved apex, ascending or horizontal, the large stipular bracts caducous, lucid on the upper darker green side, midrib and nerves yellowish; figs or receptacles pendant, luteus even their flexible stalks, in pairs from the leaf axils, globose or obovoidly so, 0.5 of an inch in diameter or smaller, sometimes 3-clustered and lateral; florets ochroleuceus.

In the alliance with *Ficus propinqua Merr., Ficus villosa Blm., Ficus crininervia Miq.* and *Ficus lagunensis Merr.*, but nearest to the first one mentioned and which may prove to be identical with *Miquel's* species.

Ficus manilensis Warb.

Notes for 15551 and 15805:—Erect or shrub like trees, in wet stony ground of densely shaded ravines at 750 feet; stem subterete, 1 foot thick or thinner, 20 feet high, branched from below the middle; the main branches widely spreading and numerously rebranched; wood soft, light in color and weight; bark brown below, grayish when younger; twigs lax and slender, ascendingly curved toward the leaf bearing tips; leaves subchartaceous, horizontal or descending, much paler beneath, mostly flat, crowded from the apex of the twigs; fruits not hard, primarily clustered from short excrescences along the branchlets and below the foliage, some trees are loaded with them, dull green, 0.4 to 0.5 of an inch thick, globose, upon slender peduncles, slightly yellowish tinged but most of them remain greenish when ripe.

Both the large and small leafed forms are represented by my two numbers.

Ficus multiramea Elm.

Notes for 14403 and 15306:—Shrubs among thickets of dry stony ground along roads and elsewhere at 250 feet; stems few from the same base, the ultimate branchlets slender and somewhat drooping; wood very soft, truly white; bark smooth, gray and dull green mixed, with milky sap; leaves always entire, chartaceous, usually horizontal or descending, darker green on the upper surface, flat, the apical portion recurved; figs nearly globose, up to 0.5 of an inch in diameter, hard and dark green or when mature soft and yellowish or yellowish red; stamens beneath the umbilical scales; florets pale white.

The younger staminate fruits are full of small larvae of a creamy white color, and which upon pinching the fig open jump out of one's hands. Finally these fully ripe male figs contain small brown colored flies. *Ficus terminalifolia Elm.* is considered a synonym of *Ficus multiramea Elm.* Neither do our specimens in hand match *Ficus cumingii Miq.* nor *Ficus angustissima Merr.,* both of which may be one and the same species.

Ficus paloensis Elm.

Notes for 15268 and 14792:—Small tree on wooded creek banks in wet stony ground at 1750 feet; stem 8 inches thick, 20 feet high, subterete and more or less crooked; its main branches from below the middle, rebranched and forming an umbrella shaped crown; wood light in color and in specific gravity, soft; bark with latex, grayish brown, warty when old, smoother on the primary branches;

twigs brown or reddish brown, not numerous, ascendingly curved toward their tips; leaves submembranous or subcoriaceous, widely spreading, folded on the upper or much darker green surface, tips recurved; fruits often in pairs from the leaf axils or from their scars, usually clustered on the branchlets beneath the foliage, 0.75 of an inch long, broadly fusiform, upon recurved stalks, finally luteus in color; florets or seed achenes brown.

Ripe fruits were dehiscing into 3 to 5 irregular parts from the apex toward the base while the fruits were still on the tree. I have noticed several trees of this species in this condition. *Ramos'* collection from Mindoro of *Ficus mindorensis Merr.* also has fruits splitting open. Grouping with *Ficus ruficaulis Merr., Ficus zambalensis Elm., Ficus banahaensis Elm.* and others.

Ficus pisifera Wall.

Notes for 15357:—Either an erect shrub or subscandent and epiphytic, never a cleaver or strangler, along ridges and in ravines at 1500 feet; stem a few inches thick, 2 to 3 yards high, laxly rebranched from below the middle; bark dirty brown to gray; the old wood moderately hard; branchlets not numerous, the ultimate ones quite long and slender, inclined to droop, its young bark on some of the twigs luteus; leaves not numerous, varying in size, membranously chartaceous, chiefly descending, flat even the tips, much paler green on the nether side, the largest ones usually terminal; receptacles solitary or in pairs from the leaf axils, often in small glomerules along the branchlets, sometimes clustered along a specialized branch or twig without leaves, globose, not hard even in the pale green state, 0.25 of an inch thick or smaller, turning yellowish red but sometimes whitish.

Possibly our specimen should be referred to *Ficus celebica Blm.*

Ficus subintegra (Merr.) Elm.

Notes for 16527:—Erect or suberect tree in wet stony ground of densely wooded ridges at 2750 feet; stem 8 inches thick, 20 feet high, branched from below the middle, crooked, subterete; wood moderately soft, white or yellowish white; bark lenticelled or excrescent, dirty brown or blackish when old; main branches ascending, crookedly rebranched, its rigid suberect twigs relatively short and often reddish brown; leaves chartaceous, harsh on both sides, paler beneath, flat, with slightly recurved tips, very unequal in size, usually oblique at the base; receptacles scabrous, clustered along the branchlets, occasionally in the leaf axils, ascending in the young state, pale green, 0.5 of an inch thick, globose or broadly elliptic, the large umbilicus raised and with its inner bracts protruding, yellowish red when fully mature; florets pink but with age turning brown.

Sparingly collected in northern Luzon and Samar is its most southern limit. The unpublished *Ficus kamelii Merr.* is this same wild fig plant.

ERRATA

P. 3114, l. 11 from bottom read *Alocasia vulcanica Elm.* or *Alocasia maquilingensis Merr.*

P. 3118, l. 18 from bottom read *M. Nephelii* for *M. Nephilii.*

P. 3120, l. 5 from top read *Boea pseudoglandulosa Elm.* or *Boea philippinensis Clarke.*

P. 3128, l. 6 from top read *Garcinia fragrans Elm.* or *Garcinia vidalii Merr.*

P. 3129, l. 7 from bottom read *Crypteronia laxa Elm.* or *Crypteronia cumingii (Plch.) Endl.*

P. 3132, l. 4 from top read *Celtis multifolia Elm.* or *Celtis philippensis Blco.*

P. 3134, l. 14 from top read *Tylophora floribunda Elm.* or *Tylophora clemensiae Schl.*

P. 3137, l. 2 from top read *Capparis irosinensis Elm.* or *Capparis oblongata Merr.*

P. 3137, l. 14 from bottom read *Loranthus vulcanicus Elm.* or *Loranthus merrillii Elm.*

P. 3138, l. 7 from top read *Macaranga utilis Elm.* or *Macaranga bicolor Muell.*

P. 3140, l. 10 from top for northen read northern.

P. 3141, l. 10 from bottom for mountainer read mountaineer.

P. 3142, l. 15 from top for close read closed.

P. 3145, l. 11 from top for blackisk read blackish.

P. 3147, l. 18 from bottom for stingy read stringy.

P. 3151, l. 18 from top for branches read branched.

P. 3236, l. 1 from bottom for *Dr. H. Wrinkler* read *Dr. H. Winkler.*

P. 3274, l. 2 from bottom for botanist read botanists.

P. 3285, l. 4 from top for *Koodr.* read *Koord.*

P. 3298, l. 6 from top for *Koodr.* read *Koord.*

P. 3300, l. 14 from bottom for refered read referred.

P. 3335, l. 9 from bottom for *Aphanamixis pulgarense Elm.* read *Aphanamixis pulgarensis Elm.*

Pp. 3376 to 3378, the type specimen number 13511 of *Dysoxylum sibuyanense Elm.* was erroneously given as from Agusan province of Mindanao, not from the island of Sibuyan.

P. 3403, l. 6 from bottom for releived read relieved.

P. 3415, l. 15 from top for *Ficus multistipulares Merr.* read *Ficus multistipularis Merr.*

P. 3443, l. 14 from bottom for *Ficus inegrifolium Elm.* read *Ficus integrifolium Elm.*

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